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AMERICAN DYESTUFF REPORTER

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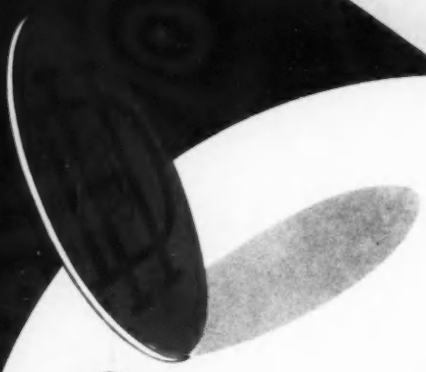

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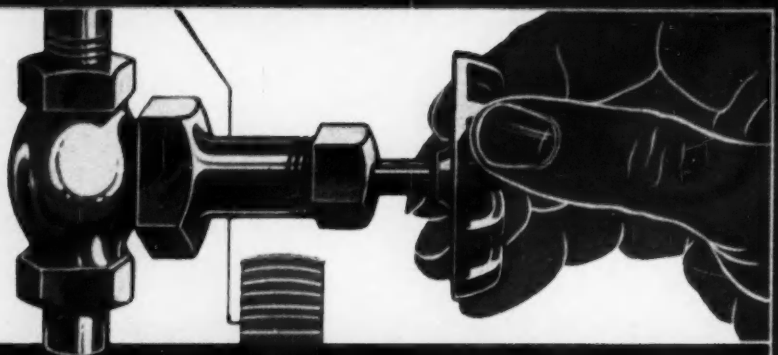

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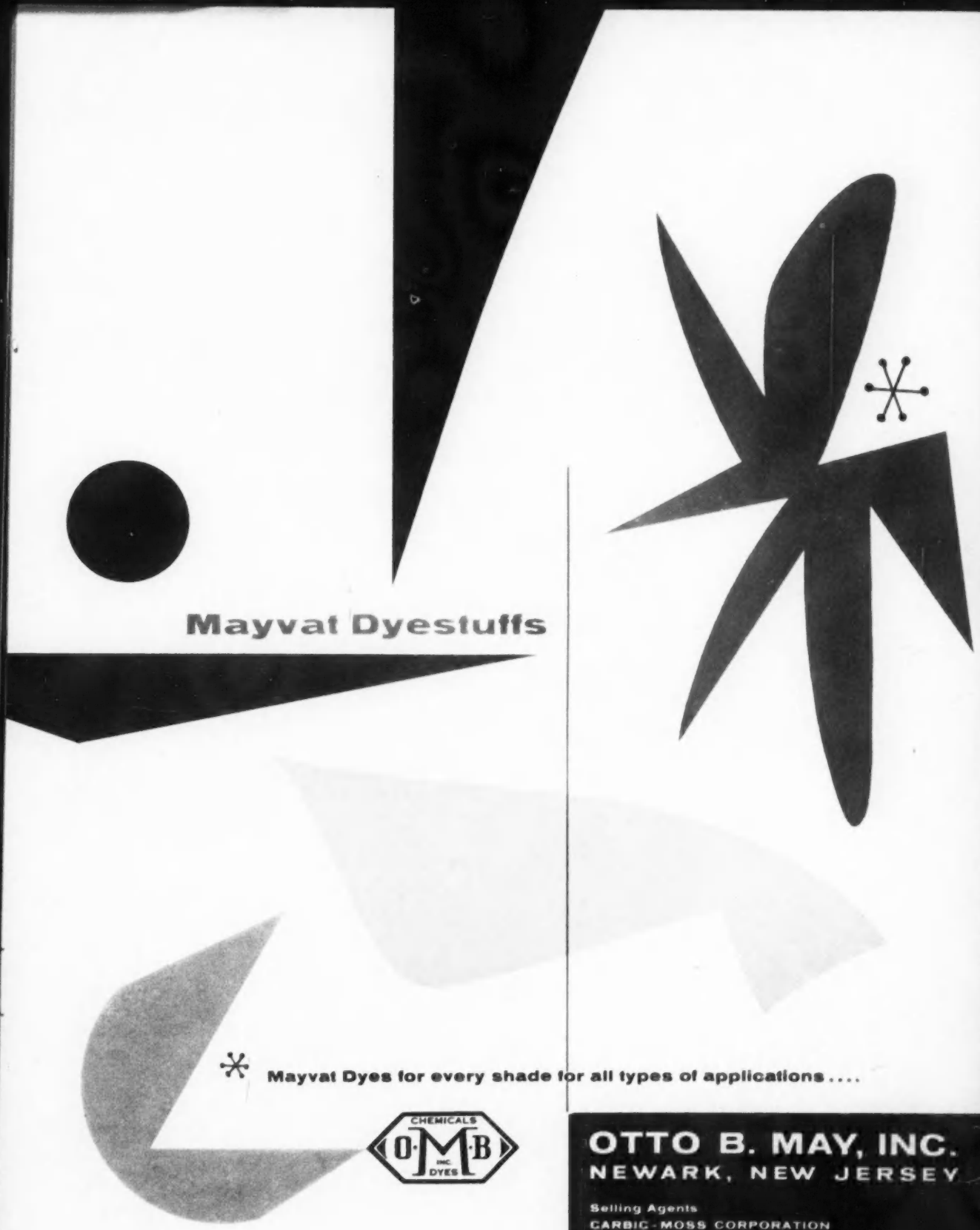
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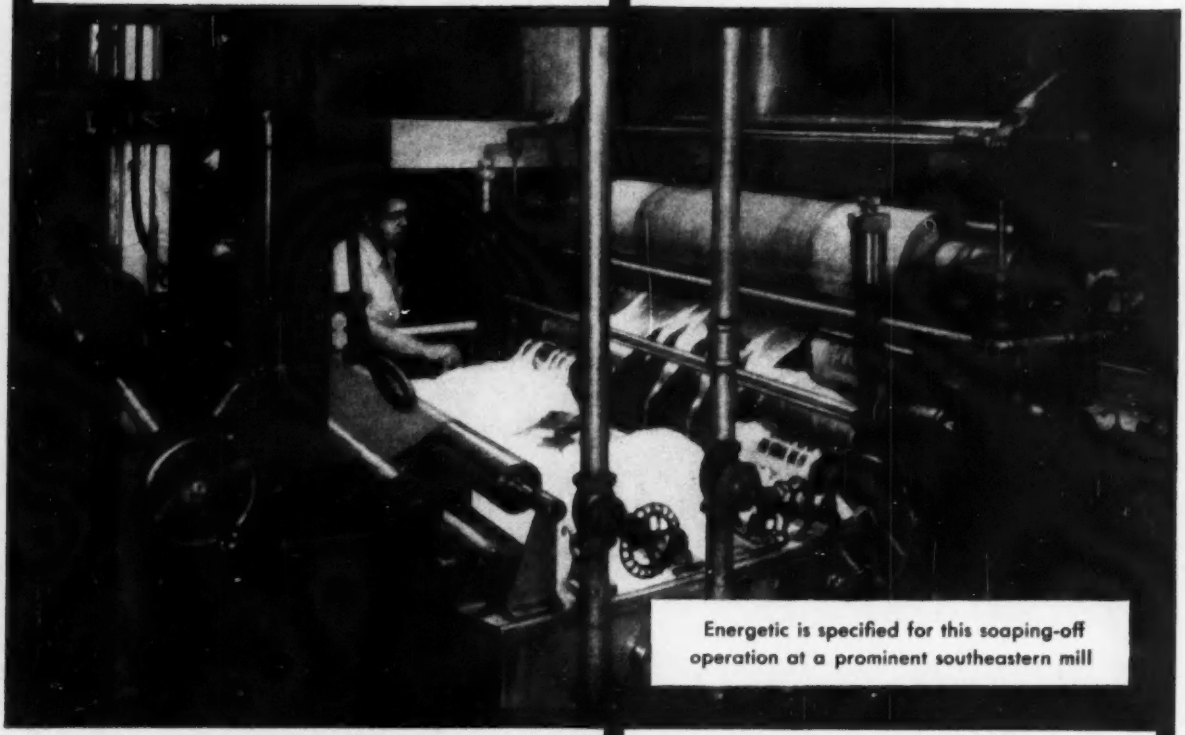

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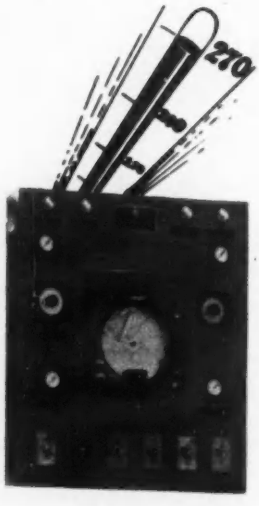

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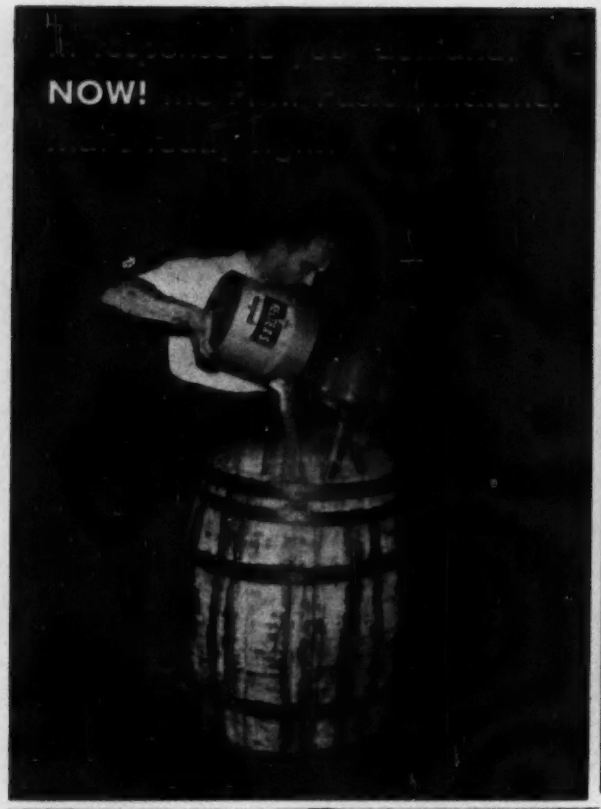

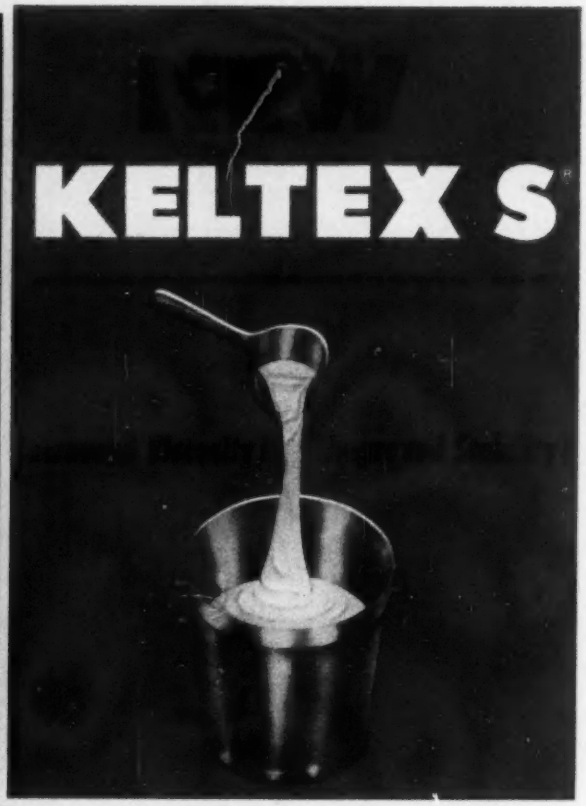

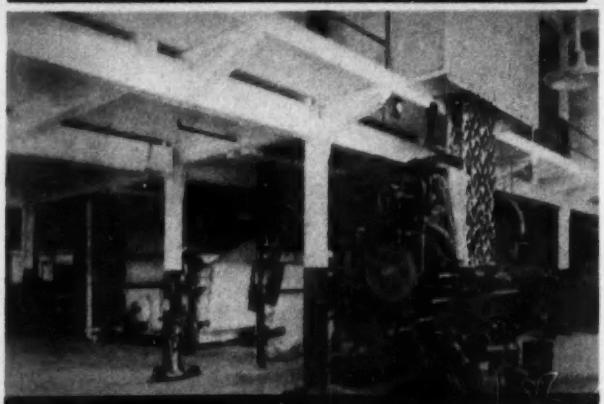

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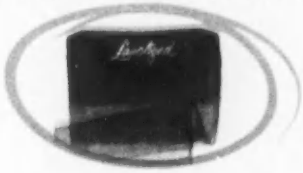

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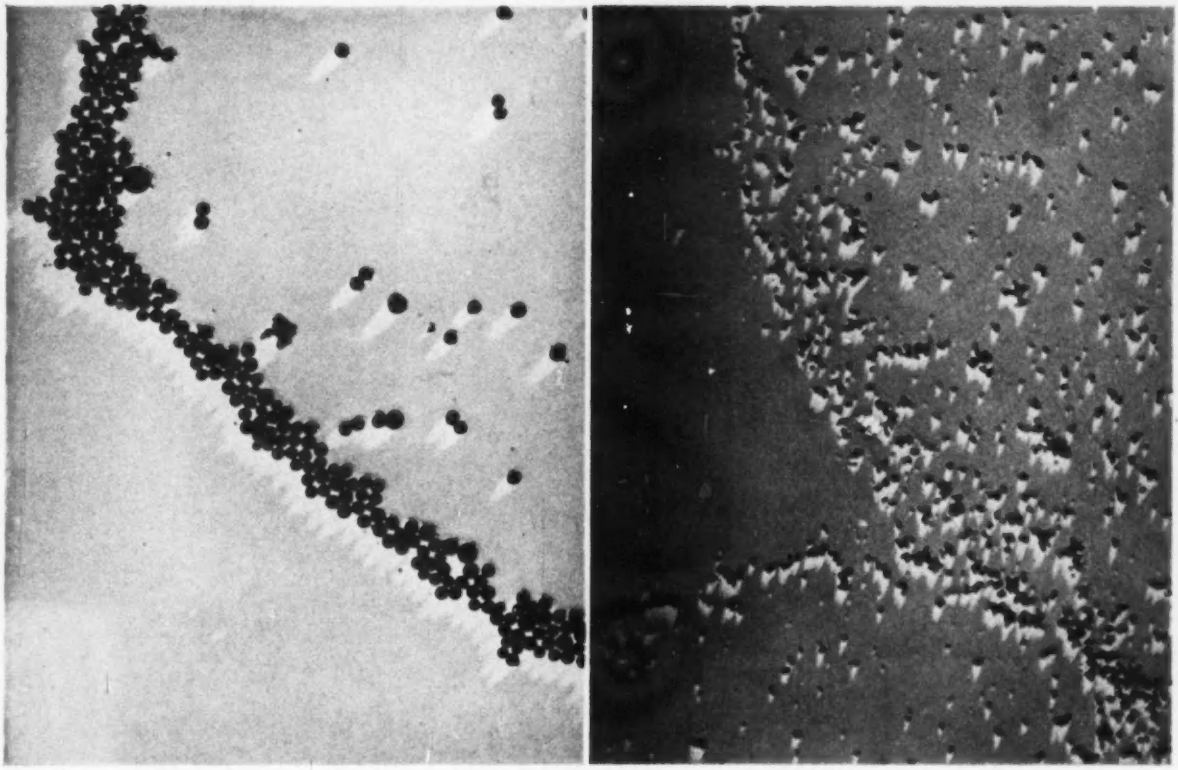

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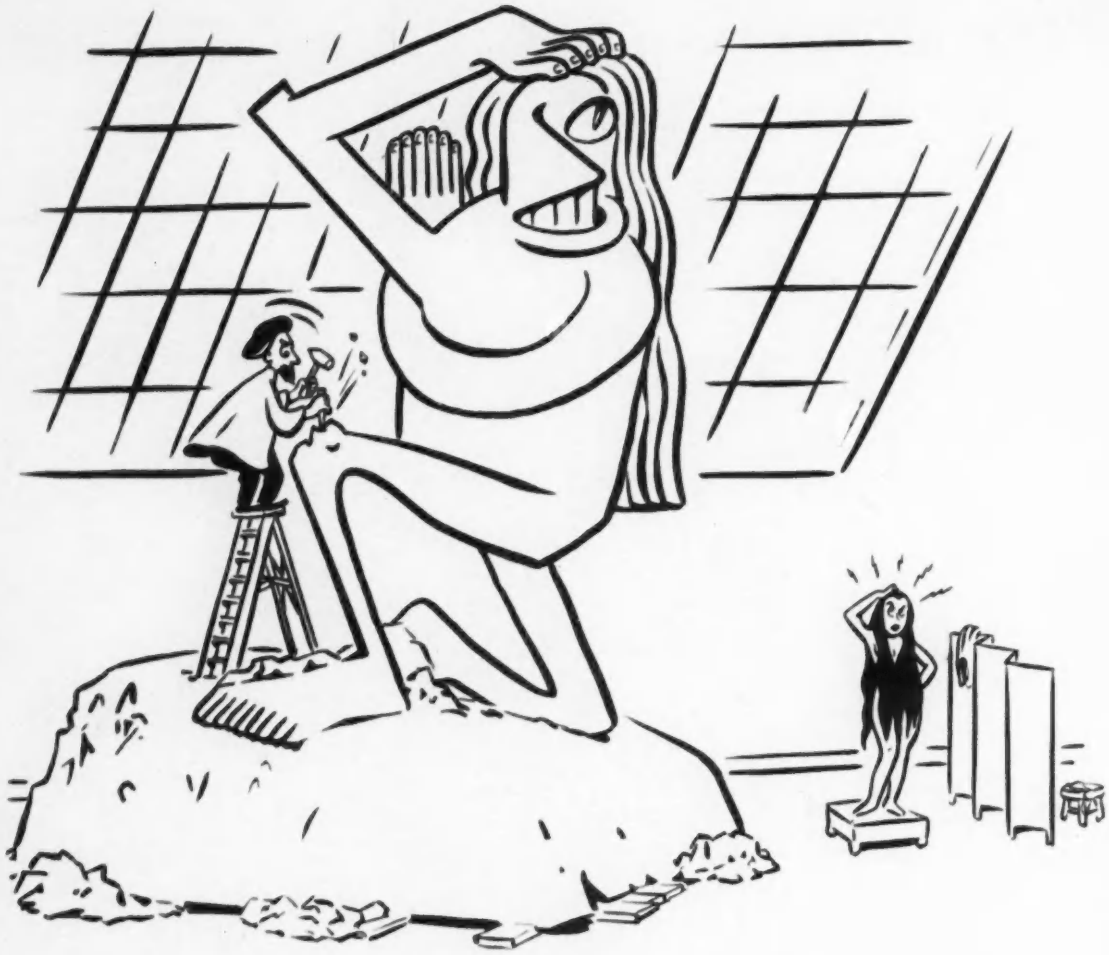

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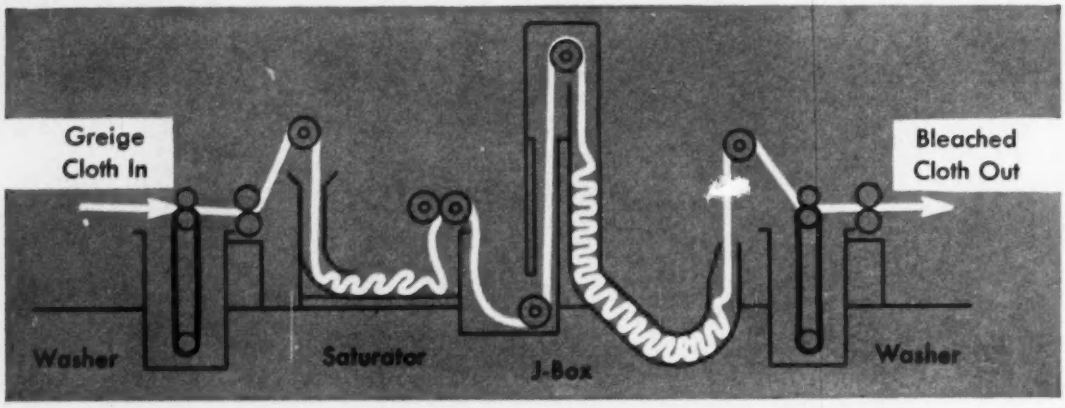

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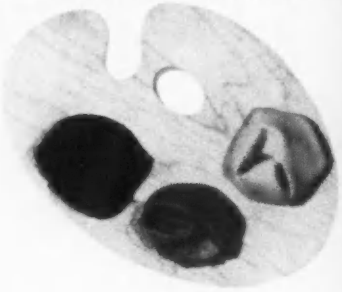

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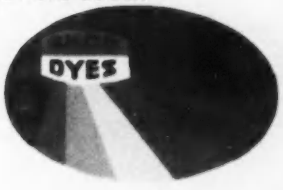
Quality 

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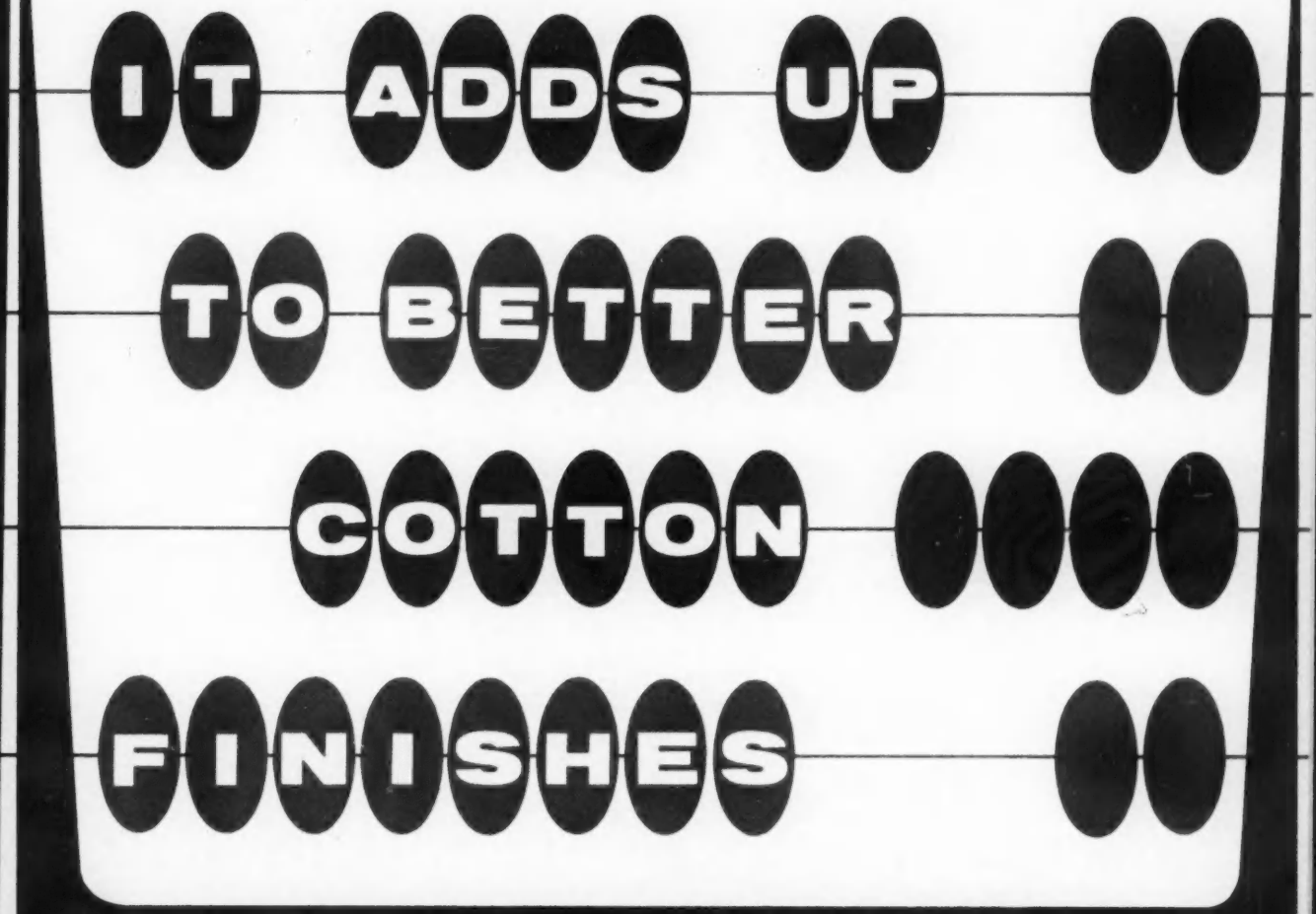

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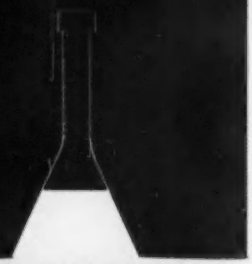

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American Dyestuff Reporter was founded in 1917 and the Textile Colorist and Converter (formerly Textile Colorist) was incorporated with it in January, 1949. Published every other Monday by the HOWES PUBLISHING COMPANY, INC., 44 E. 23rd Street, New York 10, N. Y. C. R. Howes, President; Ernest J. Finan, Executive Vice President; Norman A. Johnson, Vice President & Treasurer; Myron D. Reeser, Vice President; C. Essenbreis, Secretary.

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AMERICAN DYESTUFF REPORTER

Devoted to Textile Chemistry
BLEACHING · DYEING · PRINTING · FINISHING

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Proceedings of the

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NOVEMBER 21, 1955

AATCC CALENDAR

COUNCIL
Jan 20 (Hotel Statler, New York, N Y); Apr 20 (Philadelphia, Pa); June 15; week of Sept 10th (New York, N Y); Nov 16; Jan 18, 1957.

NATIONAL CONVENTIONS
Sept 13-15, 1956 (Waldorf-Astoria, New York); 1957 (Boston); 1958 (Chicago); 1959 (Washington, DC).

HUDSON-MOHAWK SECTION
Jan 20 (Jack's Restaurant, Albany, NY); March 16 (Hotel Johnstown, Johnstown, N Y); May 18 (Ladies Nite); June 22 (Annual Outing).

NEW YORK SECTION
Jan 27, Feb 24 (Hotel Delmonico, New York, N Y); Mar 23, Apr 27, May 18 (Kohler's Swiss Chalet, Rochelle Park, N J).

NIAGARA FRONTIER SECTION
Dec 2, Jan 20 (U S); Mar 3 (Canada—meeting to be held in conjunction with Ontario Section, CATCC); Apr 27 (U S).

NORTHERN NEW ENGLAND SECTION
Dec 9.

PACIFIC SOUTHWEST SECTION
Feb 6 (Gourmet Restaurant, Beverly Hills, Calif).

PHILADELPHIA SECTION
Dec 2, Jan 13 (Kugler's Restaurant).

RHODE ISLAND SECTION
Dec 1 (Johnson's Grille, Providence, R I).

SOUTH CENTRAL SECTION
Dec 10 (Hotel Patten, Chattanooga, Tenn).

SOUTHEASTERN SECTION
Dec 3 (Atlanta Biltmore, Atlanta, Ga).

WASHINGTON SECTION
Dec 2 (Ladies Nite—Occidental Restaurant, Washington, D C).

WESTERN NEW ENGLAND SECTION
Dec 16 (Rapp's Restaurant, Shelton, Conn).

The Employment Register apppears on page P826.

ACTIVITIES OF THE LOCAL SECTIONS

NIAGARA FRONTIER——A joint meeting of the Niagara Frontier Section and the Ontario Section, Canadian Association of Textile Colourists and Chemists, was held on October 14th at Macdonald Institute, Guelph, Ontario.

H Lomas, Canadian Aniline & Extract Co, spoke on "Classifications and Nomenclature of Synthetic Detergents."

En route to Guelph, twelve American members were conducted on a tour through the Canadian Cotton Co, Ltd, Hamilton, Ont.

NORTHERN NEW ENGLAND —— The Northern New England Section held its first meeting of the 1955-56 season at the Colonial Country Club, Lynnfield, Mass, on October 14.

Hugh R Davidson, director, Davidson and Hemmendinger, Easton, Pa, spoke on "Color Measurements—Spectrophotometety—Color Standards".

SOUTHEASTERN —— Russell Ashton Waters of Sylvania, Ga, has been selected by the Scholarship Committee of the Southeastern Section to receive the Section's first Annual Scholarship Award of $500.00.

Waters

Mr Waters is a student at Georgia Tech and is currently with the Chemstrand Corp on a co-op basis for this term. He will receive the Award at the next meeting of the Section at the Atlanta Biltmore Hotel, Atlanta, Ga, on Dec 3. Presentation of the Award will be made by H Gillespie Smith, chairman of the Scholarship Committee. Other members of the Committee are C Russell Gill, A Kempton Haynes, and Curt Mueller.

WASHINGTON——Members of the Washington Section were guests of the National Institute of Drycleaning, Silver Spring, Md, as the Section held is initial meeting of the 1955-56 season on October 7th.

Speaker of the evening was Frank A Tesi, Celanese Corp of America, who discussed "Arnel—A New Member of the Fiber Family".

The NID laboratories were open to visitors.

The next meeting of the Section, scheduled for Dec 2 at the Occidental Restaurant, Washington, D C, will be Ladies' Night. Speaker for the evening will be Norman R S Hollies, Harris Research Laboratories, who will discuss "Comfort in Clothing". A short business meeting, including the nomination of sectional officers for 1956, will precede the technical session.

1955 Intersectional Contest
Second Prize Winner——

DYEING OF WOOL WITH DIRECT DYES*

PHILADELPHIA SECTION

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This paper encompasses a comprehensive evaluation of direct dyestuffs that are presently available on the American market with respect to their ability to dye wool.

The study covers the light and wash fastness properties of these dyes on wool. Light fastness tests disclosed a range of direct dyestuffs that required 100 hours to give an appreciable break in the Fade-Ometer. Wash fastness with fibers other than wool was tested and methods for improvement investigated.

A detailed examination using certain selected dyestuffs was undertaken. The variables included exhaustion, rates of dyeing, pH, electrolytes and auxiliaries.

Comparison with acid milling dyes for both fastness and economics was made.

INTRODUCTION

THE fact that direct colors will dye wool has been known for a long time and this knowledge has been utilized to some extent in union dyeing. However, no thorough investigation of direct dyes on wool appears in the literature. The few references are indirect ones and were made on connection with other problems.

In a study of crocking on wool, Millson, Watkins and Royer *(1)* made dyeings of a few direct dyes on wool in order to test fastness to wet and dry crocking.

The Intersectional Contest Committee of the New York Section *(2)* dyed three direct colors on wool in its work on tippiness in wool dyeing; otherwise it considered only acid, milling and chrome dyes.

Bird, Nanavati and Stevens *(3)* published work on the distribution of direct dyes between wool and cotton in one-bath union dyeing. In this connection, they studied the effect of Durazol Red 2B (*CI* 278) on wool with reference to the rate of dyeing at various temperatures, the effect of Glauber's salt on exhaustion at equilibrium and the effect of pH upon exhaustion of the dyebath. As a result of this work, which was done in 1950, they stated that "direct cotton dyes are not used to any extent on wool except in union dyeings."

It was therefore decided that the Committee's objective would be a general study and evaluation of direct dyes on wool.

Dyeings were made with every available American-made direct dye listed by *Colour Index* number and Prototype in the *1954 Technical Manual and Year Book of the American Association of Textile Chemists and Colorists*. In addition to these, many unlisted dyes were secured in order to make the survey as complete as possible.

(*Editor's note*: Since the time of preparation of this paper, some of the "unlisted" dyes have been listed in the *1955 Year Book*.)

Generally, direct dyes are aromatic polyazo sulfonates. However, many acid and milling dyes also are aromatic polyazo sulfonates, so that many direct dyes would

* Presented F J De Maria on Saturday, Sept 24, 1955 in the Viking Room, Haddon Hall, Atlantic City, N J.

qualify as acid or milling dyes if chemical structure were the only criterion. Many of these dyes, which color wool as well as cotton in a neutral bath, have, through custom, always been placed in the "direct" class. This classification seems to be one of the reasons why "direct" colors have not been extensively considered for wool dyeing.

The synthesis of so many new direct dyes, particularly with the introduction of heavy metals into the molecule, lent additional interest to this subject. Copper in particular has been used extensively in this connection. In addition, there has been developed recently a group of blue and green direct dyes, containing a new grouping — the dioxazine group. These dyes are noteworthy because of a very high order of light fastness on cellulose.

MATERIALS AND METHODS

For the purposes of the Committee's work, raw wool, 50-56s domestic grade, was scoured in a six-bowl Sargent scouring train using nonionic detergent, soda ash and sodium metasilicate. The stock was lubricated and spun to 4/14s count. The resultant yarn was then scoured with a nonionic detergent and equilibrated with acetic acid to a pH of 7.0.

10-gram skeins were used in the dyeings. For the most part, the yarn-to-liquor ratio was 1:30, dyeings were run for one hour at the boil, and acetic acid was used.

EXPERIMENTAL†

Using each product in a list of commercial dyes, one percent dyeings were made on wool samples at pH 6.0 without Glauber's salt. A pH of 6.0 was chosen, as it was used considerably in previous work *(4, 5)*. This made it possible to compare exhaustion, leveling and other properties with those of acid and milling colors.

These preliminary dyeings were then subjected to Fade-Ometer exposure and tested for colorfastness to mill washing and scouring, using the AATCC Standard Test Method 1-52, Test No. 2.

White cotton samples were used in addition to the wool samples in making the tests because of the considerable interest in the subject of bleeding on cotton. Since Test Method 1-52 does not pertain to cotton or include cotton ratings, the wash fastness was rated from 1 to 5; the poorest being 1 and the best 5. The standards used for rating were as follows:

1—1% Diphenyl Fast Red B (*CI* 419)

2—1% Pontamine Copper Blue RRX (*CI* 515)

3—1% Direct Fast Blue CR (*CI* 567)

4—1% Diphenyl Rubine NR (*CI* 376)

5—1% Chlorantine Fast Yellow RNLL (unclassified)

Table I lists the results of these preliminary tests in regard to the light fastness performance on wool samples and the staining on the cotton. The results of the wash tests on the wool samples are not shown in Table I as they showed excellent results, without exception, regarding the staining on wool.

The Fade-Ometer tests showed that the direct colors compare favorably with a similar range of acid or milling colors. As can be seen from Table I, some dyes withstood 100 hours Fade-Ometer exposure.

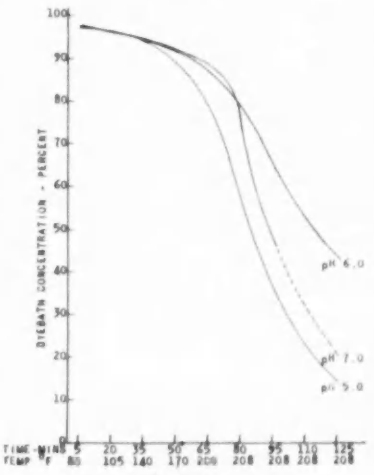

Figure 1

Diphenyl Fast Blue GLN (Pr 71)

(dotted line represents decomposition of dye)

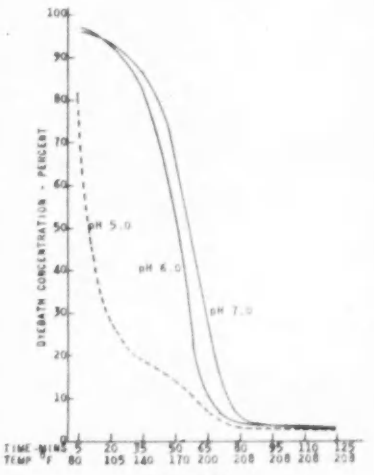

Figure 2

Diphenyl Fast Red B (*CI* 419)

(dotted line represents questionable data because of apparent indicator properties of dye)

Table I shows that the staining of cotton varied considerably from none to considerable staining. About twenty-five dyes received a rating of 5 against cotton in this test.

Two dyes with good light fastness and depth of shade, ie, Diphenyl Fast Blue GLN (Pr 71) and Diphenyl Fast Red B (*CI* 419), were selected for use in an investigation of improvement toward mill washing and scouring against cotton. These dyes were chosen because of their relatively poor fastness in this respect.

A preliminary study was made of the rates of exhaustion of these two dyes at pH levels of 5.0, 6.0 and 7.0. Buffer solutions, which were respectively 0.15, 0.16 and 0.18 molar, were used. In general, the time-temperature cycle, procedure and apparatus used by the Philadelphia Section in the paper "The Relating of Laboratory Data to Mill Practice" was used *(6)*. However, in the present work the temperature was held constant for 45 minutes after reaching 208°F.

Figures 1 and 2 show the rates of exhaustion of Diphenyl Blue GLN and Diphenyl Fast Red B.

In the case of Diphenyl Blue GLN at pH 7.0 decomposition took place. This did not occur with ten dyes similarly tried. It corresponds to the well-known decomposition of the sulfocyanine milling dyes, and can be corrected by lowering the pH or adding an oxidizing agent, such as sodium bichromate, to offset the reducing action of the wool. Diphenyl Fast Red B appears to have indicator properties at pH 5.0. Indicator properties are found in almost all classes of dyes. But these dyes do not usually find their way into practice if this property is objectionable.

The preliminary washing tests showed that about 75% of the direct dyes stained cotton to a significant extent. In order to study the possibilities of lessening this effect, consideration was given to compounds which frequently increase the wash fastness of direct colors on cotton by aftertreatment.

Diphenyl Fast Blue GLN was aftertreated with compounds or auxiliaries in a fresh bath at 160°F for 20 minutes in an effort to improve its poor fastness to mill washing and scouring against cotton. The

† All percentages expressed in this Section are based on the weight of the fiber.

TABLE I

PERFORMANCE OF VARIOUS DIRECT DYES——
COLORFASTNESS TO LIGHT AND TO MILL WASHING AND SCOURING

CI No.	*Dyestuff*	*Mfr'*	*Light Fastness (Fade-Ometer hours to appreciable break)*	*Staining of Cotton Wash Fastness Ratings— AATCC Standard Test Method 1-52, Test 2A*
	A——Dyes Arranged by Colour Index Numbers			
126	Pontamine Fast Pink GGN	DuP	40	3
128	Direct Pink BTA	G	40	3
130	Erica B	S	40	3
225	Calcomine Brill Pink SX	CCC	60	4
267	Neutral Gray GG	DuP	20	4
278	Amanil Fast Red 8BL	AAP	100	3
317	Diazine Black S	NAC	40	4
319	Chlorantine Fast Blue 3RLL	Ciba	60	3
324a	Bixamine Diazo Scarlet A	BI	40	2
326	Erie Fast Orange A	NAC	60	4
326	Erie Fast Orange WS	NAC	60	4
326	Erie Fast Scarlet 4BA	NAC	40	3
326	Erie Fast Scarlet 8BA	NAC	40	4
326	Erie Fast Scarlet YA	NAC	60	4
327	Amanil Fast Scarlet 4BS	AAP	60	3
346	Fastusol Yellow GGA	G	60	1
353	Diphenyl Blue Red B	Gy	100	4
364	Brilliant Paper Yellow P	Ciba	100	3
365	Chrysophenine	Ciba	100	4
370	Trisulphon Congo Red	S	100	2
375	Trisulphon Garnet BR	S	100+	3
375	Trisulphon Garnet BRY	S	100+	3
376	Diphenyl Rubine NR	Gy	20	2
382	Amanil Fast Scarlet B	AAP	80	2
382	Amanil Fast Scarlet 3B	AAP	80	2
385	Amidine Violet R	JC	60	3
387	Amidine Violet B	JC	20	3
393	Benzo Violet O	G	40	1
394	Pontamine Violet N	DuP	60	4
395	Amanil Black ROL	AAP	20	4
400	Erie Brill Bordeaux R	NAC	100	4
401	Pontamine Deep Blue BH	DuP	20	4
403	Pyrazol Fast Gray CAR	S	60	5
405	Niagara Blue HW	NAC	20	4
406	Pontamine Blue BB	DuP	20	4
411	Pontamine Yellow CG	DuP	40	3
415	Diphenyl Orange 2R	Gy	100	3
419	Diphenyl Fast Red B	Gy	100+	1
420	Diamine Brown MBA	G	40	3
422	Diphenyl Brown BBN	Gy	40	3
423	Direct Brown BD	G	40	4
436	Diphenyl Red 8B	Gy	100	4
446	Erie Orange R	NAC	20	4
448	Benzopurpurine 4B	S	60	2
464	Pontamine Blue 3R	DuP	20	5
466	Benzo New Blue 5B	G	20	4
468	Niagara Blue 3RD	NAC	20	4
471	Aminogene Blue RN	Ciba	20	4
472	Direct Blue BX	Gy	20	2
477	Direct Blue 3B	Ciba	20	5
478	Amidine Orange GG	JC	40	4
495	Benzopurpurine 10B	S	40	3
502	Calcomine Azurine BT	CCC	20	2
508	Dianil Blue GWN	G	60	5
512	Calcomine Blue RW	CCC	20	2
515	Pontamine Copper Blue RRX	DuP	40	2
516	Carbide Fast Brill Blue GC	Ciba	20	5
518	Amanil Sky Blue FF	AAP	20	4
520	Calcomine Sky Blue	CCC	20	4
99	Fastusol Yellow L5GA	G	60	5
147	Diazine Black OB	NAC	20	4
155	Chloramine Blue Black B	S	20	5
217	Fastusol Bordeaux 5BA	G	60	2
218	Erie Fast Brown RL	NAC	60	4
246	Chlorantine Fast Red 5BRL	Ciba	60	5
246	Pontamine Fast Red 7BNL	DuP	60	5
249	Diphenyl Pure Yellow 5G	Gy	60	4
276	Fastusol Orange LGGA	G	100+	5
277	Solophenyl Violet BRL	Gy	60	4
278	Pyrazol Fast Turquoise GLL	S	60	5
332	Pluto Black GA	G	20	2
333	Diphenyl Fast Orange G	Gy	40	4
364	Benzo Chrome Brown BA	G	100	4
365	Fastusol Brown RTA	G	80	3
366	Pyrazol Brill Fast Violet 3R	S	60	2
367	Solantine Violet FFB	NAC	60	3
368	Brilliant Benzo Green BA	G	20	4
372	Pontamine Fast Black PGR	DuP	20	4
379	Fastusol Gray LVGLA	G	60	2
393	Oxamine Brill Red BA	G	40	3
421	Pyrazol Fast Bordeaux 2BL	S	80	3
422	Solantine Bordeaux BLL	NAC	100	3
423	Pontamine Fast Brown 8RL	DuP	100	4
424	Chlorantine Fast Gray RLN	Ciba	60	5
425	Pontamine Fast Green GL	DuP	40	5
426	Chlorantine Fast Orange T4RLL	Ciba	100	5
427	Solantine Orange 5RL	NAC	100	4
428	Fastusol Red L4BL	G	80	4
429	Pontamine Fast Violet 4BL	DuP	100	5
430	Solantine Violet RLL	NAC	40	4
431	Solantine Yellow 2RLL	NAC	80	2
432	Chlorantine Fast Blue 7GLL	Ciba	60	5
439	Benzo Fast Yellow GN	G	80	4
443	Chlorantine Fast Blue BLL	Ciba	80	4
470	Calcodur Blue Green BG	CCC	60	5
490	Pyrazol Fast Orange 2RN	S	100	5
491	Fastusol Rubine LBBL	G	100	4
496	Erie Fast Red R	NAC	60	3
524	Visco Blue RS	S	20	5
525	Visco Blue GS	S	20	5
526	Chlorantine Fast Yellow 2GLL	Ciba	60	5
533	Calcomine Chinoline Yellow P	CCC	40	4
536	Pontamine Fast Orange RGL	DuP	80	4
539	Pontamine Fast Rubine B	DuP	20	4
565	Pontamine Black AWG	DuP	40	4
566	Pontamine Diazo Brown R	DuP	60	4
567	Pontamine Diazo Orange	DuP	40	2
568	Pontamine Diazo Orange 3G	DuP	100	4
569	Calcomine Navy Blue R	CCC	20	4
573	Fastusol Brown LBRA	G	80	3
575	Fastusol Brown 3RL	G	80	5
576	Fastusol Orange RRL	G	60	3
577	Solantine Scarlet G	NAC	100	4
578	Pyrazol Fast Orange 4G	S	100	4
582	Pontamine Fast Yellow RL	DuP	100	5
585	Fastusol Blue LRRU	G	60	4
588	Solantine Blue GLFV	NAC	40	4
594	Solantine Blue 3GL	NAC	40	3
606	Niagara Blue BVW	NAC	20	5

533	Chlorantine Fast Blue 4GL	Ciba	60	5
539	Direct Fast Black BF	Ciba	20	5
539	Direct Fast Black GF	Ciba	20	4
552	Pontamine Diazo Black RS	DuP	40	4
561	Trisulfon Brown B	S	20	5
561	Trisulfon Brown BP	S	20	5
567	Direct Fast Blue CR	Gy	40	3
576	Direct Fast Blue CB	Gy	40	2
577	Solamidine Brown 2G	JC	20	5
581	Erie Black GXOO	NAC	20	3
582	Pontamine Black RRX	DuP	20	3
583	Calcomine Dark Green BG	CCC	40	4
589	Erie Fast Green CGB	NAC	40	4
590	Bixamine Blue 3G	BI	20	4
593	Amanil Green B	AAP	60	3
594	Calcomine Green SL	CCC	60	3
595	Diazo Olive GA	G	20	5
596	Diphenyl Brown 3GT	Gy	20	3
598	Congo Brown G	Ciba	80	4
601	Amidine Fast Brown 3R	JC	60	3
606	Direct Brown GL	G	40	3
619	Rayon Black GSN	DuP	20	4
620	Calcomine Yellow 2G	CCC	20	5
621	Polyphenyl Orange R	Gy	60	4
622	Calcomine Yellow AF	CCC	20	5
626	Erie Orange D2R	NAC	80	3
628	Erie Catechine DC	NAC	20	4
631	Chloramine Yellow RS	S	40	5
653	Pontamine Orange PG	DuP	40	4
812	Primuline	DuP	20	4
813	Thiazol Yellow GGM	G	20	4
814	Chlorantine Fast Yellow B	Ciba	100	5
816	Thioflavine S	DuP	20	5

B——Dyes Arranged by Prototype

Pr No.				
16	Direct Rayon Black KSG	NAC	40	3
19	Erie Brill Bordeaux 6B	NAC	40	2
20	Calcomine Dark Blue B	CCC	20	4
22	Calcomine Blue B	CCC	20	3
23	Benzo Dark Brown G	G	40	3
24	Benzo Fast Black LA	G	100	2
25	Solamidine Blue 2GL	JC	40	4
26	Solantine Blue 4GL	NAC	40	5
27	Benzo Fast Blue 6GD	G	80	4
28	Fastusol Brown LGA	G	60	5
30	Direct Pink EG	Gy	40	1
31	Chloramine Rose B	S	20	3
32	Chloramine Rose 3B	S	20	4
35	Erie Brill Violet B	NAC	40	3
46	Diphenyl Fast Blue 2GLN	Gy	40	4
47	Solantine Brown BRL	NAC	60	4
48	Chlorantine Fast Brown GL	Ciba	60	5
53	Pyrazol Fast Yellow 4GL	S	40	2
54	Chlorantine Fast Yellow RL	Ciba	60	3
64	Calcomine Black 3G	CCC	60	4
67	Pontamine Bordeaux B	DuP	100	3
68	Erie Catechine B	NAC	20	4
69	Pontamine Catechu G	DuP	40	4
70	Erie Catechine 3G	NAC	60	4
71	Diphenyl Fast Blue GLN	Gy	60	3
72	Pontamine Fast Orange EGL	DuP	100	5
72	Pontamine Fast Orange EGLL	DuP	100+	5
73	Calcodur Orange ERL	CCC	40	5
95	Fastusol Brown 3RA	G	100	3
96	Fastusol Gray LRA	G	80	5
97	Fastusol Orange 5GA	G	60	3
609	Fastusol Violet LBL	G	60	5
609	Solantine Violet BL	NAC	60	5
611	Solantine Blue SFGL	NAC	100	4
611	Superlitefast Blue GL	AL	80	4
612	Calcodur Resin Fast Blue 2G	CC	40	5
612	Fastusol Blue L6GA	G	40	5
613	Calcodur Resin Fast Blue 2R	CCC	40	4
613	Chlorantine Fast Blue 2RLL	Ciba	60	4
613	Solantine Blue SFRL	NAC	40	4

C——Unclassified and Unlisted Dyes

Calcodur Resin Fast Blue R	CCC	40	4
Calcodur Resin Fast Gray 2G	CCC	40	1
Calcodur Yellow 8G	CCC	20	5
Chlorantine Fast Blue RL	Ciba	100	4
Chlorantine Fast Blue 2BLL	Ciba	60	5
Chlorantine Fast Blue 10BC	Ciba	60	5
Chlorantine Fast Brill Blue 2GLL	Ciba	80	4
Chlorantine Fast Brown CFL	Ciba	100	4
Chlorantine Fast Gray GRL	Ciba	20	4
Chlorantine Fast Green 5GLL	Ciba	100	4
Chlorantine Fast Orange ERLL	Ciba	60	5
Chlorantine Fast Yellow RNLL	Ciba	100	5
Chlorantine Fast Yellow 2RLL	Ciba	100	5
Chlorantine Fast Yellow 7GL	Ciba	60	2
Erieform Yellow GR	NAC	60	4
Fastusol Blue LBFU	G	80	5
Fastusol Blue LFFR	G	80	5
Fastusol Blue LF3GL	G	80	5
Fastusol Blue L5GA	G	20	5
Fastusol Blue L5R	G	40	5
Fastusol Brown LBU	G	100	4
Fastusol Brown TB	G	40	4
Fastusol Orange L4GU	G	100+	4
Fastusol Orange L6GU	G	100	5
Fastusol Scarlet LGG	G	100	3
Fastusol Yellow LEFC	G	80	5
Lumicrease Green 3LB	S	80	5
Lumicrease Sky Blue 6GUL	S	20	5
Lumicrease Yellow 3LG	S	60	5
Niagara Fast Copper Bordeaux BGL	NAC	20	3
Niagara Fast Copper Blue EG	NAC	20	2
Pontamine Brown T2G	DuP	40	4
Pontamine Fast Blue BLL	DuP	60	5
Pontamine Fast Blue CPL	DuP	20	5
Pontamine Fast Brown SKRL	DuP	60	5
Pontamine Fast Brown 2RL	DuP	100	4
Pontamine Fast Brown 3YL	DuP	100	4
Pontamine Fast Brown 4RL	DuP	100	4
Pontamine Fast Gray BL	DuP	40	5
Pontamine Fast Gray 2GL	DuP	40	5
Pontamine Fast Gray 3BL	DuP	80	5
Pontamine Fast Orange 2GL	DuP	100	5
Pontamine Fast Red 8BNL	DuP	100	5
Pontamine Fast Yellow L2RX	DuP	40	5
Pontamine Green 2Y	DuP	40	2
Pontamine Orange DB	DuP	40	4
Pyrazol Discharge Brown G	S	80	5
Pyrazol Discharge Orange 3LG	S	100+	5
Pyrazol Fast Gray 2BL	S	60	5
Pyrazol Fast Rubine FBL	S	60	5
Solantine Blue 2GL	NAC	60	4
Solantine Brown R	NAC	100	4
Solantine Brown 4R	NAC	100	3
Solantine Gray GL	NAC	100	4
Solantine Violet R	NAC	100	2
Superlitefast Blue RL	AL	100	4
Superlitefast Blue GUF	AL	20	4
Superlitefast Gray UFLL	AL	40	4
Superlitefast Rubine WLKS	AL	100	3
Superlitefast Yellow EFC	AL	100+	5

[1] See explanation of key to makers' names on page 175, 1955 AATCC Technical Manual and Year Book.

following compounds used as aftertreatments showed little if any improvement in wash fastness against cotton:

2% Ahcofix A
2% aluminum acetate
2% aluminum chloride
2% aluminum sulfate
5% barium phosphate
2% ceric nitrate
2% ceric sulfate
2% chrome alum
2% chromium fluoride
2% cobalt acetate
2% cobalt sulfate
2% copper sulfate
2% ferrous sulfate
2% formaldehyde
2% lead acetate
5% magnesium sulfate
2% Naccufix
2% nickel acetate
2% nickel sulfate
2% Polyanthrene KS
2% sodium bichromate
2% Standye Fix W
2% stannous chloride
2% Xynofix FL
1% copper sulfate
2% Polyanthrene KS
1% copper sulfate
2% sodium bichromate
2% formaldehyde
2% sodium bichromate

The two following aftertreatments showed a considerable improvement to mill scouring tests against cotton:

2% Lyofix EW Conc
2% Sandofix WE

Very good fastness was obtained by an aftertreatment in a fresh bath with 5% tannic acid at 200°F for 20 minutes, followed by an addition of 3% tartar emetic for 20 minutes.

Excellent wash fastness was obtained by adding at the end of the dyeing 3% chromium fluoride at the boil for 20 minutes.

The same aftertreatments were applied to dyeings of Diphenyl Fast Red B. Those showing excellent fastness to mill scouring against cotton were:

2% chrome alum
2% chromium fluoride
2% formaldehyde
2% sodium bichromate
2% stannous chloride
2% sodium bichromate
1% copper sulfate
5% tannic acid
5% tartar emetic

The only significant shade changes in aftertreatments of these two dyes occurred with the use of copper salts.

Since chromium fluoride gave excellent improvement in wash fastness against cotton with Diphenyl Fast Blue GLN and Diphenyl Fast Red B, it was chosen for further experiments. Four other direct dyes, which possessed poor fastness to bleeding on cotton in AATCC Test Method 1-52, Test No. 2, were aftertreated at the boil for 30 minutes with the addition of 2% chromium fluoride to the exhausted dyebath. The four aftertreated dyeings showed a striking improvement when tested for washing by the same method. All ratings increased at least two points, using the standards previously mentioned. The dyes used were:

Solantine Blue BLL (Pr 443)
Solantine Bordeaux BLL (Pr 422)
Erie Orange D2R (*CI* 626)
Solantine Violet R (unclassified)

Solantine Violet R changed from a reddish to a bluish violet in the aftertreatment.

LEVELNESS———The method used to evaluate the leveling or migration properties of Diphenyl Fast Blue GLN and Diphenyl Fast Red B was similar to that used by previous investigators (5, 7). Dyeings were made with each of the two dyes, using 1% dye at pH 6.0, with no Glauber's salt. Then, a 2.5-gram skein of the dyed material and a 2.5-gram skein of undyed yarn were placed in fresh baths, at a yarn-to-liquor ratio of 1:50. Each bath was set at a different pH level with various alkalis and acids. After a 1.5-hr

TABLE II

MIGRATION OF DIRECT DYES ON WOOL

Chemicals in Bath	*Initial pH of Bath*	*Final pH of Bath*	*% Dye on Dyed Skein*	*% Dye on Blank Skein*
Diphenyl Fast Blue GLN (Pr 71)				
1% formic acid (85%)	2.7	3.1	100	* 1
1% acetic acid (56%)	3.4	4.2	100	* 2
No addition	5.6	5.7	95	* 5
10% calc Glauber's salt	6.1	6.2	85	10
1% ammonia (27%)	9.9	6.4	90	7
1% sodium carbonate	10.3	8.9	60	0
Diphenyl Fast Red B (*CI* 419)				
1% formic acid (85%)	2.6	3.4	100	1
1% acetic acid (56%)	3.9	4.9	100	3
No addition	6.7	6.7	95	10
10% calc Glauber's salt	7.7	6.8	85	20
1% ammonia (27%)	10.3	6.6	80	25
1% sodium carbonate	10.6	8.6	10	4

* Color much redder and duller than normal.

TABLE III

EFFECT OF AUXILIARIES ON MIGRATION OF DIRECT DYES

Auxiliaries	*Initial pH*	*Final pH*	*% Dye on Dyed Skein*	*% Dye on Blank Skein*
Diphenyl Fast Blue GLN (Pr 71)				
2% Nopco 1425-B	7.2	5.6	100	10
2% Nopco 1425-B 10% calc Glauber's salt	6.7	5.7	120	15
2% Hymolon K	9.2	7.7	70	2
2% Hymolon K 10% calc Glauber's salt	9.0	7.2	70	10
Diphenyl Fast Red B (*CI* 419)				
2% Nopco 1425-B	7.2	6.2	80	10
2% Nopco 1425-B 10% calc Glauber's salt	6.8	5.9	70	20
2% Hymolon K	9.0	7.8	25	15
2% Hymolon K 10% calc Glauber's salt	8.9	7.3	40	30

boil, both skeins were removed from the bath.

The amounts of dye on each skein at the end of the boiling period were noted as a percentage of the original dyeing. Observations are shown in Table II.

It is evident that leveling is improved by higher pH or the use of Glauber's salt. The greater transfer in the use of higher pH corresponds with previous work *(5)* with both acid and milling dyes relative to leveling. However, this previous work showed that Glauber's salt did not improve leveling with milling dyes normally processed at pH levels around 6.0. Comparison with the leveling of Polar Brilliant Blue RAW in the same work *(5)* indicates that the direct dyes migrate more slowly. The improvement obtained with Glauber's salt is significant and points out that it should be used in the dyeing of direct dyes on wool.

Previous study *(5)* has shown improved results in leveling of milling dyes by the use of auxiliaries. Using two of the most effective of these, both alone and in combination with Glauber's salt, another series of migration tests were carried out. Table III shows the results.

The surface-active agents distinctly improve the migration of these direct dyes, comparable to their effect on milling dyes on wool *(5)*. The presence of Glauber's salt is again a factor of considerable importance. Alone or in combination, the amount of dye transferred to the blank skein is always greater.

TIPPINESS———In the study of tippiness or skitteriness, 5-gram locks were drawn from the backs of 58's domestic fleece wool. These locks were wrapped in 18-mesh cotton gauze to maintain lock form. 1% dye was added to distilled water together with acid at a wool-to-liquor ratio of 1:60. The temperature was raised to the boil and maintained under reflux for the periods shown in Table IV, pH adjustments being made where necessary. In the case of the chrome dyes, 0.5% of sodium bichromate was added after 35 minutes boil and boiling was continued 25 minutes longer. Tippiness ratings of good, moderate and poor were given in accordance with earlier work *(2)*. These are shown in Table IV. Five of the dyes chosen had previously been rated *(2)* and were selected to give a range from good to poor.

In these tests, the direct dyes show a variation in tippiness somewhat similar to that shown by the milling and chrome dyes. Less tippiness was noted with the use of Glauber's salt with the three direct dyes.

Following previous work *(2)*, an attempt was made to minimize the tippy dyeing. Methods and auxiliaries were tested in the case of Diphenyl Fast Blue GLN, rated poor in Table IV. In these experiments, the acid and auxiliary were first added to the bath, then the wool, followed by 5 minutes presoaking. Except where noted, dye was then added, the temperature raised to the boil in 30 minutes, and boiling under reflux was continued for 45 to 75 minutes. The effects are shown in Table V.

A reversal of tippiness from positive (tip darker than body of wool) to negative (tip lighter than body) is indicative of an over-correction *(2)*. This occurred with 10% Calcomet Salt Powder and 10% Nopco 1426 A. These were then reduced in amount as shown in Table V and the tippiness eliminated. Similar results have been obtained previously with milling dyes *(2)*.

SELECTED DIRECT DYE RANGE———A group of direct dyes capable of matching practically any shade and possessing excellent light and wash fastness was chosen. Further studies were made on these, particularly in comparison with milling dyes. Dyeings were made to complete exhaustion, lowering the pH below 6.0 where necessary.

These eight selected dyes were:

Solantine Violet BL (similar to Pr 69)
Fastusol Blue LFFR (unlisted)
Lumicrease Green 5LB (unlisted)
Fastusol Yellow LFFG (unlisted)
Pontamine Fast Orange FGL (Pr 72)
Fastusol Red L4BL (unlisted)
Pyrazol Fast Rubine FBL (unlisted)
Pyrazol Fast Gray 2BL (unlisted)

Dyeings to determine the rate of exhaustion were made with each of the eight selected dyes. The time-temperature cycle was the same as that used previously with Diphenyl Blue GLN and Diphenyl Red B. Using acid and 10% calcined Glauber's salt, final pH levels of 5.5 and 6.2 were obtained without the use of buffers. The results of pH variation are shown in Figures 3 to 10. The lowering of the pH increases the rate of dyeing and the amount of dye adsorbed, as it does with acid and milling dyes.

Some of the work of the Philadelphia

TABLE IV
TIPPINESS

Dye	C I No.	Type	% calc Glauber's Salt	Minutes at Boil	Final pH	Tippiness Rating
Calcochrome Fast Red ECB	652	chrome	10	60	5.2	G
Pontacyl Wool Blue GL	833	milling	0	45	5.45	P—M
Pontacyl Wool Blue GL	833	milling	10	60	5.0	M
Chromoxane Pure Blue BA	720	chrome	10	60	5.0	M
Brilliant Indocyanine 6BA	Pr 222	milling	10	60	5.2	M
Calcomine Scarlet B	382	direct	0	45	5.62	M—G
Calcomine Scarlet B	382	direct	20	45	5.62	G
Erie Scarlet 3B	382	direct	0	45	5.75	G
Erie Scarlet 3B	382	direct	20	45	5.52	G
Diphenyl Fast Red B	419	direct	0	45	5.48	G
Diphenyl Fast Red B	419	direct	20	45	5.58	G
Diphenyl Fast Blue GLN	Pr 71	direct	0	45	5.68	P

Tippiness Ratings: G—Good M—Moderate P—Poor

TABLE V
CORRECTION OF TIPPY DYEING
1% Diphenyl Fast Blue GLN (Pr 71)

Method or Auxiliary	Minutes at Boil	Final pH	Tippiness Rating
None (control)	75	6.28	P
185 ppm hardness	75	6.35	P
Dye added at start of boil	75	6.30	P
20% calc Glauber's salt	75	6.10	M
10% Drew Leveling Salt	75	6.35	P
10% Drew Leveling Salt Dye added at start of boil	75	—	P
10% Calcomet Salt Powder	75	6.30	P
0.5% Calcomet Salt Powder	45	5.68	G
10% Nopco 1426-A	75	6.75	P
2% Nopco 1426-A	45	5.40	G

Section *(6)* in 1951 was done with acid and milling dyes at pH 5.0. In Figures 11 to 14 comparisons are made of this work with four of the eight selected direct dyes. The pairs, one a direct and the other an acid or milling dye, were selected because the percent of exhaustion at 95 minutes was practically the same under similar pH conditions.

It is noteworthy that in all cases the rate of dyeing is much slower and uniform with the direct dyes than with the acid or milling color. This is particularly true in the early stages of dyeing where this property is so important for levelness in application.

For comparative evaluation with milling dyes, the eight selected direct dyes were matched with milling dyes of the highest fastness type.

The dye matchings and percentages are as follows:

DIRECT DYES	*MILLING DYES*
0.8% Solantine Violet BL	0.49% Aliz Violet AD 0.13% Wool Fast Blue GL (*CI* 833) 0.16% Aliz Lt Brown BL
0.5% Fastusol Yellow LEFC	0.25% Supranol Yellow RA (*CI* 642)
0.55% Fastusol Blue LFFR	0.125% Indocyanine Blue BA
1% Fastusol Red L4BL	0.85% Xylene Fast Rubine 3GP (Pr 412) 0.7% Polar Red RL
0.65% Pontamine Fast Orange EGL (Pr 72)	0.9% Milling Yellow 3G (*CI* 642)
0.6% Lumicrease Green 3LB	0.39% Aliz Lt Green GSN (*CI* 1078) 0.3% Brill Aliz Milling Blue FGL 0.06% Aliz Lt Brown BL
0.6% Pyrazol Fast Rubine FBL	0.42% Xylene Fast Red 6BL (Pr 453) 0.09% Brill Aliz Milling Blue FGL 0.1% Aliz Lt Brown BL
0.5% Pyrazol Fast Gray 2BL	0.44% Brill Aliz Milling Blue FGL 0.4% Aliz Lt Gray RLL 0.06% Aliz Lt Brown BL

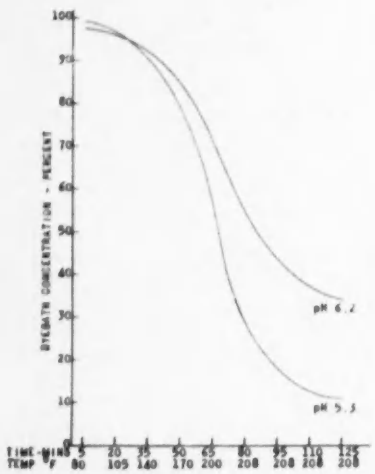

Figure 3
Solantine Violet BL (similar to Pr 609)

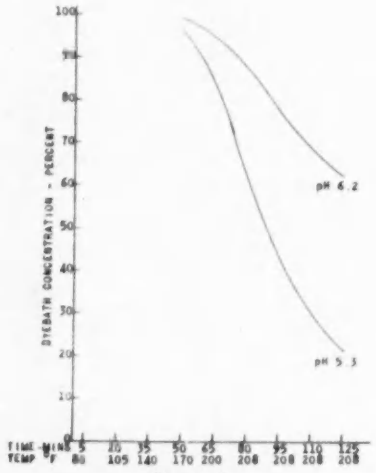

Figure 4
Fastusol Blue LFFR (unlisted)

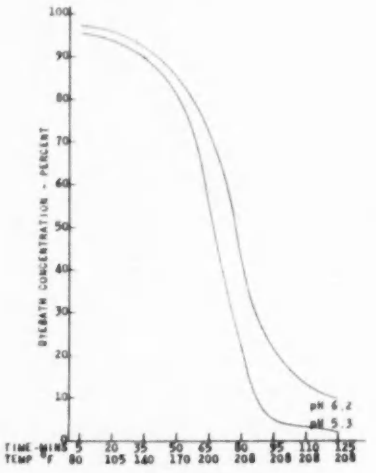

Figure 5
Lumicrease Green 3LB (unlisted)

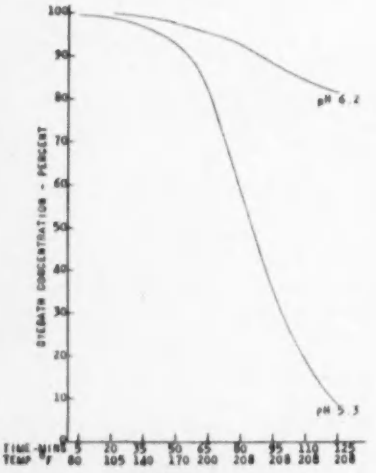

Figure 6
Fastusol Yellow LEFC (unlisted)

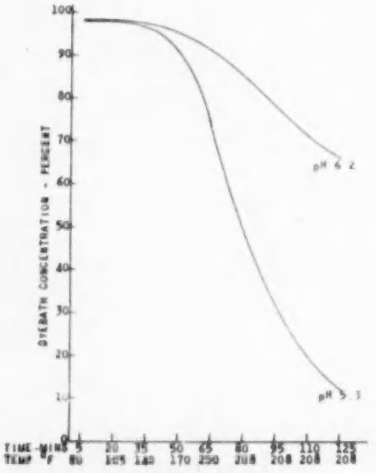

Figure 7
Pontamine Fast Orange EGL (Pr 72)

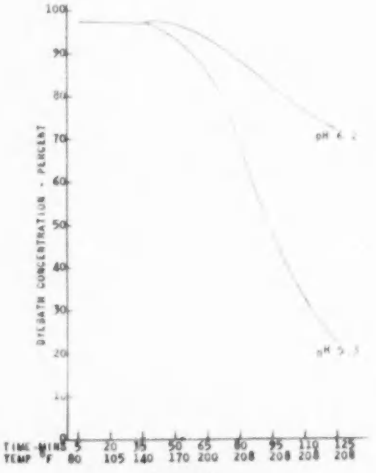

Figure 8
Fastusol Red L4BL (unlisted)

In addition, the selected direct dye range was aftertreated with chromium fluoride, which, in previous experiments, had improved fastness.

The three groups, selected direct dyes, the same aftertreated with chromium fluoride, and the matches with milling dyes were then exposed in the Fade-Ometer and also given the following AATCC wash tests:

a) Colorfastness to Commercial Laundering and Domestic Washing, Tentative Test Method 38-52.

b) Colorfastness to Mill Washing and Scouring, Standard Test Method 1-52, Test No. 3.

c) Colorfastness to Mill Washing and Scouring, Standard Test Method 1-52, Test No. 4.

White cotton was again added in the washing tests and the same ratings used as in Table I. Results of these tests are shown in Table VI. Evaluation of the percentage dye remaining on the dyed wool skeins after washing is also given.

The fastness to commercial laundering and domestic washing is excellent throughout, with only a slight weakness in fastness to staining against cotton shown by one direct and one milling dye.

When tested according to Test No. 3, Mill Washing and Scouring, the direct dyes show slightly better retention of dye than the milling colors. This superiority is frequently increased by aftertreatment with chromium fluoride. Both types of dyes are excellent regarding the staining of wool and the milling dyes show a slightly better fastness against the staining of cotton.

When tested according to Test No. 4, which is very severe, the direct dyes are superior in all but one instance to the milling dyes in respect to loss in color, slightly superior in staining against wool and inferior in staining against cotton. In most cases the chromium fluoride aftertreatment distinctly increases their superiority in retention of color and, in half the tests, improves the fastness to staining cotton.

The direct dyes show a slightly superior

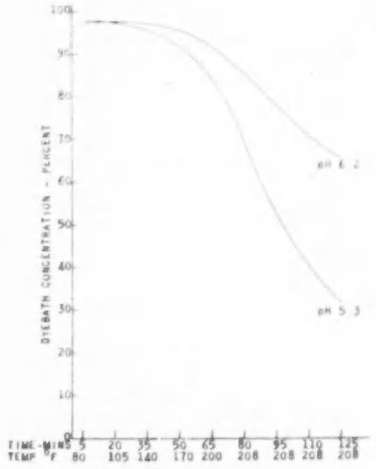

Figure 9
Pyrazol Fast Rubine FBL (unlisted)

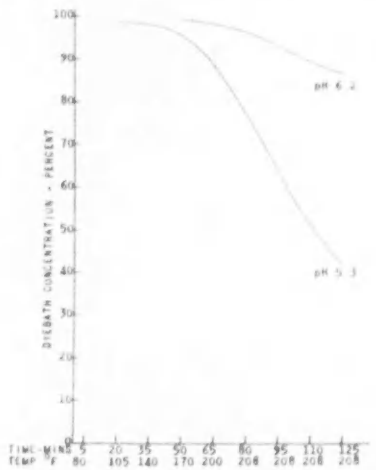

Figure 10
Pyrazol Fast Gray 2BL (unlisted)

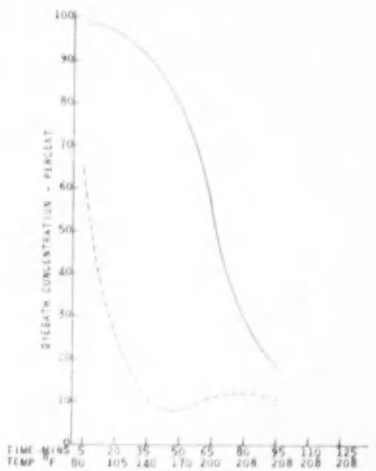

Figure 11
Solid Line: Solantine Violet BL (similar to Pr 609)
Dotted Line: Pontacyl Violet RL (Pr 197)

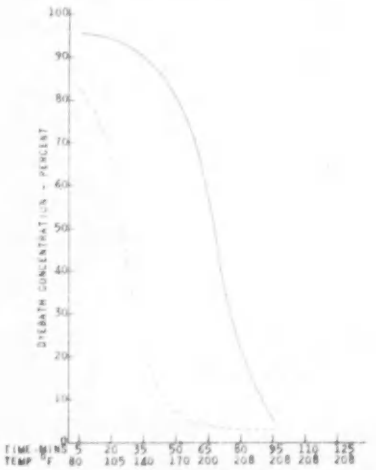

Figure 12
Solid Line: Lumicrease Green 3LB (unlisted)
Dotted Line: Du Pont Anthraquinone Green G (*CI* 1078)

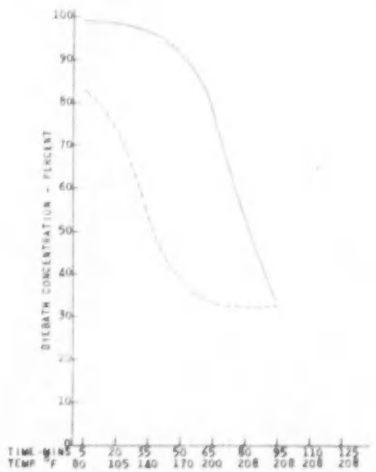

Figure 13
Solid Line: Fastusol Yellow LEFC (unlisted)
Dotted Line: Pontacyl Light Yellow GX (*CI* 639)

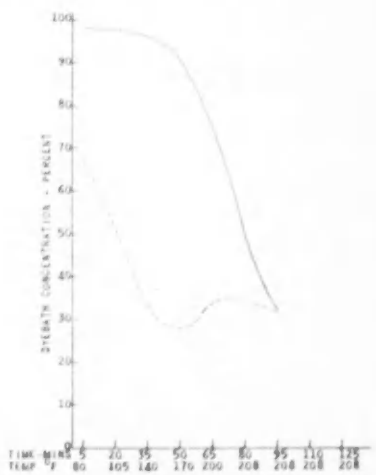

Figure 14
Solid Line: Pontamine Fast Orange EGL (Pr 72)
Dotted Line: Du Pont Orange G (*CI* 27)

TABLE VI

COMPARATIVE RATINGS OF DIRECT AND MILLING DYES
COLOR FASTNESS

	38-52 Commercial Laundering and Domestic Washing			MILL WASHING AND SCOURING 1-52 Test No. 3			Test No. 4			Fade-Ometer hours to appreciable break
	% Orig dye remaining	Stain on wool	Stain on cotton	% Orig dye remaining	Stain on wool	Stain on cotton	% Orig dye remaining	Stain on wool	Stain on cotton	
Sol Violet BL	100	5	5	60	5	5	50	5	5	60
CrF_3 aftertreatment	100	5	5	100	5	5	100	5	5	100
Milling dye match	100	5	5	50	5	5	30	4	5	40
Fastusol Blue LFFR	100	5	5	70	5	4	40	5	3	60
CrF_3 aftertreatment	100	5	5	80	5	4	40	5	5	80
Milling dye match	100	5	5	60	5	5	30	5	5	60
Lumicrease Green 3LB	100	5	5	80	5	5	80	5	4	80
CrF_3 aftertreatment	100	5	5	80	5	4	100	5	4	100+
Milling dye match	100	5	5	80	5	5	50	4	5	60
Fastusol Yellow LEFC	100	5	5	100	5	4	80	5	4	100
CrF_3 aftertreatment	100	5	5	100	5	5	90	5	5	100+
Milling dye match	100	5	5	80	5	5	70	5	5	100
Pontamine Fast Orange EGL	100	5	5	90	5	4	80	5	4	100
CrF_3 aftertreatment	100	5	5	90	5	4	100	5	4	100+
Milling dye match	100	5	5	90	5	5	70	5	5	80
Fastusol Red L4BL	100	5	4	80	5	3	60	5	3	100
CrF_3 aftertreatment	100	5	5	90	5	4	80	5	3	80
Milling dye match	100	5	4	70	4	5	40	4	5	100
Pyrazol Fast Rubine FBL	100	5	5	80	5	5	70	5	4	60
CrF_3 aftertreatment	100	5	5	90	5	5	90	5	5	100
Milling dye match	100	5	5	60	4	5	20	3	5	60
Pyrazol Fast Gray 2BL	100	5	5	70	5	4	40	5	3	60
CrF_3 aftertreatment	100	5	5	90	5	5	60	5	4	60
Milling dye match	100	5	5	60	5	5	50	5	5	60

fastness to exposure in the Fade-Ometer and this is usually increased by aftertreatment with chromium fluoride.

As a matter of economic interest, the total cost of the direct dyes was approximately 20% lower than that of the milling dyes.

SUMMARY

Applications of approximately 260 direct dyes were made on wool. All of these were capable of dyeing wool at pH 6.0 and could be completely exhausted if necessary. Lowering of pH increased the rate of dyeing, ie, it is a method of control. The rate of exhaustion of the direct dyes, so important in practical application, was significantly slower and more uniform than that of comparable acid and milling dyes at the same pH.

Exposure of these dyeings in the Fade-Ometer showed a range of a few hours to over 100 hours without appreciable break. Fastness to staining against white wool in wash tests was excellent throughout. Fastness to staining against white cotton in severe tests varied from poor to very good, but was satisfactory to milder commercial laundering and domestic washing. Their inferiority in this respect to milling dyes corresponds to the inferiority of milling dyes in wash fastness against wool. However, the use of chromium fluoride as an aftertreatment generally resulted in a distinct improvement in wash fastness against cotton. The retention of dye by direct colors in wash tests was superior to milling colors.

Migration under dyeing conditions was slight, but some improvement was possible with Glauber's salt and auxiliaries. Tippiness varied from dye to dye but was controllable by auxiliaries.

CONCLUSION

Direct dyes bear a considerable resemblance to milling colors not only in chemical constitution but also in dyeing and fastness properties. Generally avoided previously because of their customary classification as "direct" dyes, a number of them are worthy of serious consideration for wool dyeing.

ACKNOWLEDGMENT

The Committee gratefully acknowledges the assistance of Marie Kalix, Harry Birkby and Ali Khan of the Philadelphia Textile Institute, who made practically all the numerous Fade-Ometer and wash tests, and Henry E Millson of American Cyanamid Co, who made numerous helpful suggestions and rated the dyeings for tippiness.

The Committee also greatly appreciates the cooperation received from the following concerns:

Allegheny Dye Works
Ankokas Dyeing and Processing Co
American Cyanamid Co
Ciba Co, Inc
Continental Mills
Refined Products Co
E I du Pont de Nemours & Co, Inc
Geigy Dyestuffs Div
General Dyestuff Co
Globe Dye Works Co
Hart Products Corp
Hellwig Dyeing Co
James Lees & Sons Co
C H Masland and Sons Co
National Aniline Div
Para-Chem, Inc
Philadelphia Textile Institute
Poplar Textiles Co
Rohm & Haas Co
Sandoz Chemical Works, Inc
Scholler Bros, Inc
Fred Whitaker Co

REFERENCES

(1) Millson, Watkins and Royer, *Am Dyestuff Reptr* 36, 45 (1947).
(2) New York Section, AATCC, *ibid* 36, 486 (1947).
(3) Bird, Nanavati and Stevens, *J Soc Dyers Colourists* 36, 281 (1950).
(4) Philadelphia Section, AATCC, *Am Dyestuff Reptr* 37, 149 (1948).
(5) Philadelphia Section, AATCC, *ibid* 43, 839 (1954).
(6) Philadelphia Section, AATCC, *ibid* 40, 84 (1951).
(7) Ris, Stocker and Thommen, *J Soc Dyers Colourists* 64, 297 (1948).
(8) Millson, *Am Dyestuff Reptr* 38, 578 (1949).

1955 Intersectional Contest——

A STUDY OF THE SOILING OF NATURAL AND MANUFACTURED FIBERS FROM AQUEOUS SYSTEMS*

NEW YORK SECTION

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Fifteen natural- and manufactured-fiber fabrics were soiled with two representative soils, which were applied by padding, spraying and immersing techniques. These soiled fabrics were washed using four different standard methods employing the Terg-O-Tometer and Launder-Ometer. The results were evaluated by reflectance measurements.

In most cases, soil applied by the spraying technique produced the heaviest soiling and was the most difficult to remove by the washing procedures. The use of the padding technique resulted in the lowest amount of adherent soil and this soil was the most easily removed. Application by the immersion method produced slightly heavier and slightly more retentive soil then did the padding technique.

The type of fiber and its physical condition influenced the amount of soil retained by the fabric through any soiling treatment and also the tendency of the soil to adhere to the fabric during washing.

The experimental results indicate that soiling and washing under standard conditions can be used to forecast the soiling characteristics of the fabrics under normal end-use conditions.

INTRODUCTION

THERE was a time, not too many years ago, when the textile industry was concerned only with cotton, linen, silk and wool. Today these have been augmented by an impressive list of man-made fibers having a wide range of physical and chemical properties. To add to the complexity of the situation, these fibers may be blended in the preparation of a fabric or their physical or surface characteristics may be modified by special treatments or finishes.

The four natural fibers have been used by man for thousands of years, and out of accumulated human experience there has developed a knowledge of many of the end-use characteristics of these fibers. This is not the case, however, with the relatively new fibers, fiber blends or special treatments. Yet it is the various textile properties, singly and in relation to one another, which determine the acceptance of a textile product by the public for general or special use.

The complexity of the textile situation and the continual development of new fibers, finishes and treatments make just that much more important the test methods by which the various use characteristics of a textile can be evaluated either singly or in combination.

It is a costly process to develop a fiber or textile treatment to the point where it is really ready for sales promotion in the market. There have been all too many cases in recent years where much of the work and cost that have gone into such developments have been thrown away largely because of faults which the consumer discovered after the product was put on the market. The ability of the public to judge a product by the way it behaves under use conditions often is not appreciated, or it is ignored. The formulation of a final judgment may require a relatively long time, but it can be surprisingly accurate.

Test methods for use characteristics not only reduce the possibility of serious mistakes but should lead to the development of a successful product or process at an earlier date. It is, realized, of course, that many such tests in their present form are not completetly reliable, but with judgment they can serve in a screening capacity and produce much valuable information. Obviously, the proper time to evaluate a product from the use standpoint is during the course of development.

One of the properties of great importance, but which has received little attention until the last few years, is the manner and extent to which a fabric soils under use conditions and how tenaciously the acquired soil is retained when the fabric is washed. The test method or methods used for this purpose preferably should be relatively simple laboratory procedures that are capable of giving reproducible results and reflect the tendency toward soiling under normal use conditions.

PERTINENT LITERATURE——

The problem of fabric soiling received little attention until 1949. In fact, the preceding twenty years saw only three important contributions appear in the literature.

Astrom, in an article published in 1929 *(1)*, gave a review of the literature on the particle size of smokes and fogs and their absorption by cotton and wool fibers.

In 1936 Kruger *(2)* studied the soiling of cotton fibers in garments by the secretions from sweat glands and hair. On the basis of a microscopic examination of the soiled cotton textiles he concluded that degree of soiling and resistance to the removal of the soil depended upon the solubility of skin excretions and fabric construction.

In 1939 Masland *(3)* concluded that a) fiber diameter and cross-sectional outline are the factors that govern the rate of dry soiling, and b) only large fibers (diameter over 27 microns) with a smooth cross-sectional outline and a smooth surface can show low soil retention.

Leonard, in two articles on the resoiling of carpets *(4, 5)* showed that an oily or detergent residue left on the fibers by a location cleaning process could cause rapid resoiling during use.

* Presented by Ralph B Smith on Saturday, September 24, 1955 in the Viking Room, Haddon Hall Hotel, Atlantic City, N J.

The 1951 International Contest paper of the New York Section *(6)* dealt with the soiling of flat fabrics by dry soil and with the soiling of carpet fabrics during use by methods used by Leonard *(5)*. The dry soiling was carried out by subjecting a series of fabrics to airborne soil with a blower test method and by tumbling fabrics with a dry soil. It was concluded that soil may be brought into contact with a fabric by diffusion, interception from air, by transfer from a soiled surface and by electrostatic attraction. Once in contact with the fibers the soil particles may adhere to the fabric by mechanical forces, by occlusion in the irregularities in the fiber surfaces, by oil bonding and possibly by electrical forces. The degree of soiling which occurs during test and use appears to be a function of both the extent of soil contact and the soil retention characteristics of the fabric.

A great deal of work on detergency and soiling has been done at the Institute of Textile Technology during the past few years *(7, 8, 9, 10, 11, 12, 13)*. Studies were carried out on representative textile fibers which had been chopped up in a Wiley mill to a length of 0.1-1 mm. Most of this work covered the aqueous soiling of these chopped fibers with two forms of carbon black, with and without the presence of oil or greases. Soiling was evaluated both by reflectance measurements and on the basis of calculations by which the actual or relative soil content was determined. These papers indicate that the various fibers differ with respect to the area occupied by crevices and the rate of primary deposition of soil. They also indicate that a greasy fiber surface shows sorptive binding of the soil, which does not appear during the primary stage of soil deposition but only when the water has been removed from the system.

Weatherburn and Bayley *(14)* have tested the soiling characteristics of a series of different fibers by a modification of the tumbler test described in the New York Section's 1951 Intersectional Contest Paper *(6)*. The fibers studied were in the form of unbleached carpet yarns and were treated prior to soiling to insure complete grease removal. The soiling was carried out in a Launder-Ometer using vacuum-cleaner dust similar to that used in the experimental work covered by this paper. After being soiled, the fibers were chopped to a length of about 1 mm, made into pads, and the reflectance determined.

The literature on soiling relates in the main to the soiling of fabrics or yarns on the dry side or the wet soiling of fibers in the chopped form. The only important exception is the work done on the preparation of soiled fabrics for detergency studies, which in turn has been limited almost entirely to plain-weave cotton fabrics.

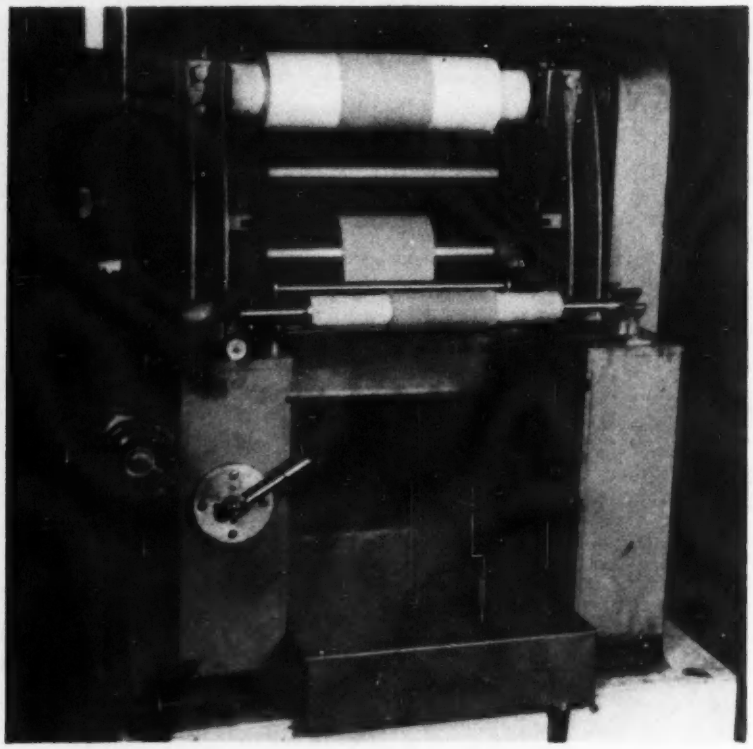

Figure 1
Pad soiling of fabric on Butterworth laboratory 3-roll padder

Hart and Compton, in their published work on the soiling of fabrics *(20)*, showed that, in general, fabrics will pick up more soil than will chopped fibers of the same type under the same conditions of soiling. They also developed an equation by which the percent macro-occluded soil could be calculated.

It is apparent from the literature that the effect of the many variables, such as fiber, fabric construction, finishing treatments, and the different types and particle size of soils, makes it extremely improbable that any single test will ever predict the soiling characteristics of a fabric, but rather that the integrated information of several different tests will be necessary to characterize this property of a fiber or fabric.

In view of the dearth of information on the soiling of fabrics in the wet state, it was the feeling of the Committee that there was a distinct need for a test method which would give direct information with regard to this property.

MATERIALS AND METHODS

TYPES OF SOIL ——— The fifteen fabrics listed in Table I were soiled with vacuum-cleaner-dust soil and with synthetic soil, which were considered to be typical of naturally occurring soils.

The reasons for adopting vacuum-cleaner dust as a standard soil were two-fold: first, it represents dirt which is actually present in the home, and second, it is readily available in large quantities. It has been found also that samples of vacuum-cleaner dust obtained from widely separated geographical locations and from different homes and commercial establishments were remarkably similar in chemical composition *(23)*. One of the leading manufacturers of household vacuum cleaners has given an approximate analysis of vacuum-cleaner dust as follows *(21)*:

Ingredient	*(%)*
moisture	3
sand, clay, quartz, feldspar	45
limestone, dolomite	5
gypsum, dolomite	5
animal fibers	12
cellulosic materials	12
resins, gums, starch, etc	10
fats, oils, rubber, tar	6
undetermined	2

The synthetic soil used is identical with that used by Florio and Mersereau *(22)*, and is similar to that developed by Sanders and Lambert *(23)*. This soil was chosen since it is typical of that which is occluded by clothing and other household fabrics.

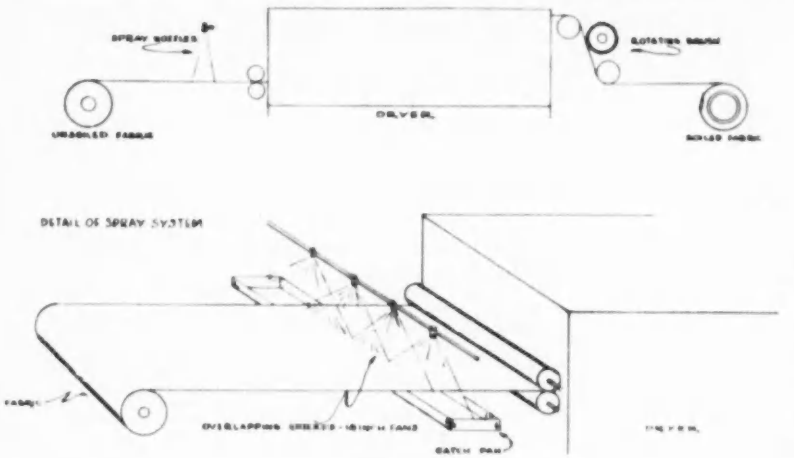

Figure 2
Spray soiling of fabric on one side

TABLE I

FABRICS USED FOR SOILING TESTS

1	100% filament-Dacron shirting (fancy)
2	100% spun-Dacron shirting (plain batiste)
3	100% filament-nylon shirting (plain weave)
4	100% spun-nylon blouse (plain weave)
5	100% filament-Orlon shirting (fancy)
6	100% spun-Orlon shirting (plain weave)
7	100% spun-viscose gabardine (no finish)
8	100% spun viscose gabardine (resin finish)
9	gabardine (spun-acetate warp, spun-rayon filling)
10	100% bright filament-acetate taffeta
11	100% silk crepe
12	100% mercerized cotton broadcloth
13	100% cotton Indian Head fabric
14	100% woolen fabric shrinkproofed with Lanaset
15	100% nylon 2-bar tricot

The liquid components of the Sanders and Lambert soil are replaced in this soil by mineral oil to obtain more uniform soil application. The solid materials are present in essentially the same proportions as those found in the soil by the above investigators.

Prior to the soil being used, it was ball milled with steel balls for about 24 hours, screened to pass through a 200-mesh screen, and conditioned at 65% relative humidity.

The composition of this soil is as follows:

Ingredient	*(%)*	*Source of Supply*
humus	38.0	Hyperhumus Co. Newton, N J
Portland cement	17.0	Hercules Cement Corp. Hercules, Pa
silica (200-mesh)	17.0	Witco Chemical Co. New York, N Y
carbon black (Molacco Furnace Black)	1.7	Benny and Smith New York, N Y
iron oxide (Red N 1860)	0.3	C K Williams & Co E St Louis, Ill
white mineral oil (domestic light)	8.8	Eimer and Amend, New York, N Y

METHODS OF APPLICATION OF STANDARD SOILS TO FABRICS——Methods for applying soil to fabrics were chosen with a view towards achieving laboratory conditions analogous to the means by which fabrics are soiled in actual use. It appeared that fabrics are generally soiled in one of three ways:

a) By light contact of one surface of the fabric with a soil, as would be experienced if a garment were brushed against a soiled surface.

b) By smearing of soil into the fabric or by immersion of the fabric in a soiling solution with consequent deep penetration of the soil into the fibers.

c) By spraying of cloth with a solution containing soil, as by mud splashing on garments being worn.

A—PRINTING OF STANDARD SOILS ON TEST FABRICS: In the early stages of the investigation an attempt was made to apply a paste of vacuum-cleaner-dust or synthetic soil to the fabric by means of a conventional laboratory printing machine. In order to prepare a workable paste, it was necessary to blend starch with the vacuum soil, thereby introducing an unknown variable into the soiling process. Moreover the abrasiveness of the vacuum soil caused damage to the print rolls. It was therefore decided to abandon this method of application of soil after a few preliminary tests.

B—PADDING OF STANDARD SOILS ON TEST FABRICS: The two aforementioned soils were applied to the 15 test fabrics using a conventional laboratory-type padder as shown in Figure 1. The vacuum-cleaner-dust soil was made up with 20% solids and 2% Tamol based on weight of solution. The synthetic soil was made up with 10% solids and 1% Tamol. The Tamol was dissolved in water, the soil added, and the mixture blended in a Waring blender for 30 minutes. The fabrics were padded through two rolls with the pressure on the rolls set at 100% pickup on cotton. The fabrics were air dried and the loose surface soil vacuumed prior to the washing tests.

C—SPRAYING OF STANDARD SOILS ON TEST FABRICS: The two standard soils were applied to the same fabrics by spraying. The soiling mixture or suspension was prepared by mixing 10% by weight of soil in water with a Waring blender for 5 minutes. The soil suspension was then sprayed on both sides of the fabric by means of overlapping spray nozzles until the fabric was completely saturated. The apparatus is shown in Figure 2. After soiling, the fabric was dried and the excess soil removed by brushing.

D—APPLICATION OF STANDARD SOILS TO TEST FABRICS BY LONG LIQUOR IMMERSION: In the long-liquor-immersion method of soil application the cloth was prewet and fed into a slurry of the soil on guided rollers, as shown in Figure 3. The respective slurries contained 15% by weight of the vacuum-cleaner dust and 18% of the synthetic soil in tap water. While still immersed in the

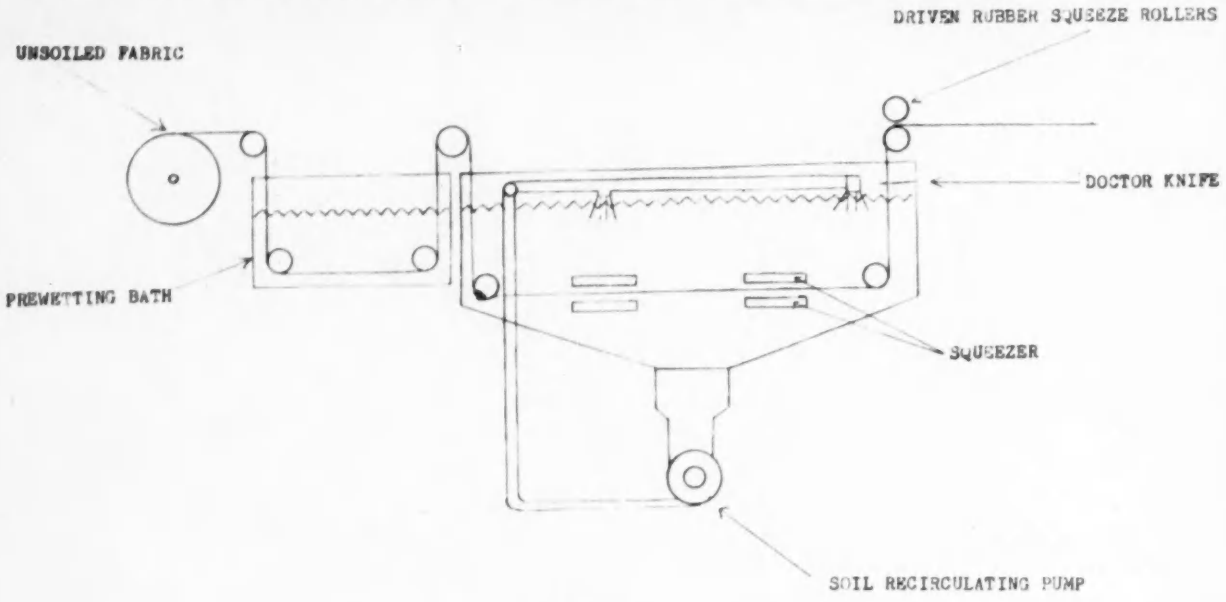

Figure 3
Soiling of fabric by long liquor immersion

slurry the fabric was passed between soft rubber strips (under slight pressure), which smeared the soil into the cloth and insured uniform penetration. The time of immersion of the cloth in the soiled suspension was approximately 30 seconds. As the cloth emerged from the soiling suspension it was squeezed between another pair of rubber rollers. The suspension was maintained in a state of agitation by the use of compressed air. The cloth was air dried and then vacuumed to remove the excess soil that adhered to the fabric.

WASH METHODS FOR TESTING SOILED FABRICS——Wash tests were carried out both in a Launder-Ometer and a Terg-O-Tometer.

The tests conducted with the Launder-Ometer were made in accordance with Standard Test Methods 36-54, Test II and 61-54, Test 2A described in the AATCC Year Book *(24)*.

The tests conducted with the U S Testing Co Terg-O-Tometer *(25)* utilized both a 0.25% built alkylaryl synthetic detergent containing no optical bleach and a 0.30% white neutral soap (household type) having a titer of approximately 35°C. They were made in 100 ppm hardness water at 120°F. The washing cycle was 15 minutes followed by a 3-minute rinse.

EVALUATION OF SOILING——Users of textiles instinctively estimate the degree of soiling by the apparent luminous reflectance of the fabric, which for the average observer has been shown to be equivalent to the reflectance as measured using a green tristimulus filter *(15)*.

The instrument used in this work was a Hunter Color and Color-Difference Meter, a tristimulus colorimeter that measures color on three scales, thereby giving uniform measures of visual perceptibility of differences between color. The readings closely approximate the X, Y and Z functions of the International Commission on Illumination (ICI) system. The unit of color measurement for the three scales is the NBS unit of color difference devised by Judd *(16)*.

Three values were measured on each sample, ie, Rd (equivalent to the Hunter green-filter reflectance) and the a and b values, which determine hue and chroma; however, only the Rd values were used in evaluating the results of soiling and washing. This was due to the fact that the various samples showed only minor hue variations from the gray scale. However, under other conditions of test, the a and b values or their equivalents might prove of importance in interpreting the soiling tests.

All reflectance measurements were made with one instrument and by the same operator. The data are therefore free of differences due to machine variables, which could have developed if the readings had been made in the different participating laboratories.

The reflectance of a fabric is usually defined as that obtained when a sufficient number of fabric thicknesses are employed so that the background effect on the reflectance readings becomes negligible. With a cotton fabric of the sheeting type this usually occurs with from 6 to 8 thicknesses, but with sheer or semitransparent fabrics more thicknesses are required. In this work a minimum of 6 thicknesses of fabric was employed with a backing plate, the reflectance of which closely approached that of the sample being measured. A set of 15 plates was available for this purpose and the maximum reflectance difference between any two plates was 6.9% in the range above 60% reflectance. Using this method it was possible to reduce the background error to a negligible value. The methods used in making the reflectance measurements were those employed by Diaz, Paitchel and Woodhead *(17)*.

It is recognized that the decrease in reflectance of textile fabrics which occurs through contact with soil is a measure of the apparent visual degree of soiling, but the reflectance does not bear a linear relationship to the weight of the retained soil *(7, 18, 19)*.

The work covered by this paper was done on a series of fabrics, several of which were known to have received finishing treatments. Results have been reported in terms of reflectance readings.

DISCUSSION AND RESULTS

The object of this research was to develop a simple and reliable test method by which the soiling characteristics of

TABLE II

ORDER OF SOIL PICK-UP ON THE TEST FABRICS*

Fabric	Types of Soil Application					Total Average Rank
	Synthetic soil (padded)	Vacuum-cleaner-dust soil (padded)	Vacuum-cleaner-dust soil (immersed)	Synthetic soil (immersion)	Synthetic soil (sprayed)	
100% spun-nylon blouse	5	1	1	2	3	1
Lanaset-treated woolen fabric	3	2	3	1	10	2
100% nylon 2-bar tricot	2	3	4	4	9	3
100% spun-Orlon shirting	6	10	2	3	4	4
100% spun-Dacron shirting	8	7	5	6	1	5
cotton Indian Head	7	5	8	6	7	6
spun-viscose gabardine (no finish)	1	4	10	9	11	7
silk crepe	9	9	6	5	8	8
spun-viscose gabardine (resin finish)	4	6	7	8	14	9
100% filament-Orlon shirting	11	12	11	3	6	10
mercerized cotton broadcloth	14	11	9	9	2	11
100% filament-Dacron shirting	10	13	14	10	4	12
100% filament-nylon shirting	12	15	9	11	5	13
gabardine, spun-acetate wrap, spun-rayon filling	7	8	12	12	13	14
100% filament-acetate bright taffeta	13	14	13	7	12	15

* Based on reflectance measurements.

different textiles may be evaluated. It was felt that the scope of this work embodied not only an investigation of the ease with which soil was picked up by the fabric, but also the tenacity with which it is bonded to the cloth and resists removal by washing.

In order to arrive at a satisfactory test method for measuring soil adherence to various textiles and the ease with which the soil can be removed by washing, it was necessary to devise a simple and reproducible method of applying soil to cloth. It is essential, of course, that the method of soil application permit the even distribution of soil on the fabric and show selectivity with regard to both fiber type and fabric structure. Three methods of soil application were found applicable to the synthetic soil described earlier, and it was also found that two of these methods of application could be used with vacuum-cleaner-dust soil. The synthetic soil was applied by padding, by immersion, and by spraying; the vacuum-cleaner-dust soil was applied by padding and by immersion.

Cloths soiled with vacuum-cleaner dust had a slight brownish cast as contrasted with the bluish-black shade produced by the synthetic soil. Despite these minor differences in color, the hue and chroma ratings of the soiled cloth were not sufficiently different to affect evaluation based on the green-filter-reflectance readings.

Synthetic soil applied by padding generally produced the least-darkening of the textiles, while synthetic soil applied by immersion and by spraying gave darker cloths in that order. Cloths soiled with vacuum-cleaner dust were generally intermediate in degree of soil between cloths soiled by padding with synthetic soil and cloths soiled by immersion with synthetic soil. The immersion method of soiling with vacuum-cleaner dust gave slightly darker cloths on the average than soiling by the padding method.

There were some inconsistencies between relative amounts of soil absorbed by the several fabrics when exposed to the different conditions of soiling and to the two kinds of soil. On an overall basis, however, the fabrics which absorbed the greatest amount of soil (or showed the greatest darkening) were the spun fabrics, the 2-bar nylon tricot and wool. The filament fabrics absorbed the least soil. Cotton Indian Head and cotton broadcloth were intermediate. The following is a listing of the 15 fabrics arranged in order of soil adherence, with the fabric which absorbed the greatest amount of soil at the top of the list:

spun-nylon blouse
wool (Lanaset-treated)
2-bar nylon tricot
spun-Orlon shirting
cotton Indian Head
spun-viscose gabardine (no finish)
silk crepe
spun-viscose gabardine (resin finish)
filament-Orlon shirting
cotton broadcloth
filament-Dacron shirting
filament-nylon shirting
spun-viscose gabardine — acetate warp, rayon fill
bright filament-acetate taffeta

TABLE III

REFLECTANCE DATA ON PRINTING STANDARD SOILS ON TEST FABRICS

Fabrics	Synthetic soil			Vacuum-cleaner-dust soil		
	* 4S	** 4S#	Δ	* 4S	** 4S#	Δ
spun-viscose gabardine, no finish (Original reflectance 88.2)	22.6	51.6	29.0	51.4	71.7	20.3
spun-viscose gabardine, resin finish (Original reflectance 86.8)	31.0	77.6	46.6	56.6	82.0	25.4
filament-nylon shirting (Original reflectance 74.7)	18.5	64.2	45.7	36.1	70.9	34.8
spun-Dacron staple (Original reflectance 70.4)	15.7	65.3	49.6	33.9	71.7	37.8
Orlon challis (Original reflectance 79.6)	16.9	37.9	21.0	37.6	68.1	30.5
Cotton Indian Head (Original reflectance 84.9)	24.3	51.9	27.6	48.0	68.3	20.3

* Reflectance readings after soiling.

** Reflectance readings after washing in the Terg-O-Tometer with 0.25% of an unbuilt synthetic detergent.

TABLE IV
REFLECTANCE READINGS

Soil and Method	Terg-O-Tometer Synthetic			Terg-O-Tometer Soap			Launder-Ometer Cotton Wash #2			Launder-Ometer Accelerated Wash #2A			Average		
	AS*	ASW**	Δ	AS*	ASW**	Δ	AS*	ASW**	Δ	AS*	ASW**	Δ	AS*	ASW**	Δ
Gabardine, spun-acetate warp, spun-rayon filling (original reflectance, 76.8)															
Synthetic Padded	41.6	63.7	22.6	41.1	65.0	23.9	41.1	64.5	23.4	41.1	60.8	19.7	41.1	63.5	22.4
Vacuum Padded	36.6	65.9	29.3	36.6	63.3	26.7	36.6	65.1	28.5	36.6	65.3	28.7	36.6	64.9	28.3
Vacuum Immersed	40.8	62.6	21.8	40.8	63.9	23.1	40.8	62.8	22.0	40.8	66.7	25.9	40.8	64.0	23.2
Synthetic Immersed	24.2	42.6	18.4	24.2	46.6	22.4	24.2	52.6	28.4	24.2	60.2	36.0	24.2	50.5	26.3
Synthetic Sprayed	20.2	45.0	24.8	20.2	44.1	23.9	20.2	49.3	29.1	20.2	43.8	23.6	20.2	45.55	25.35
Bright filament-acetate taffeta (original reflectance, 87.4)															
Synthetic Padded	56.5	72.8	16.3	56.5	77.0	20.5	56.5	76.9	20.4	56.5	89.9	33.4	56.5	79.15	22.65
Vacuum Padded	48.7	78.9	30.2	48.7	79.0	30.3	47.7	72.1	23.4	48.7	87.9	39.2	48.7	79.475	30.78
Vacuum Immersed	41.9	75.3	33.4	41.9	77.1	35.2	41.9	89.8	47.9	41.9	88.6	46.7	41.9	82.7	40.8
Synthetic Immersed	18.4	51.9	33.5	18.4	57.7	39.3	18.4	67.0	48.6	18.4	72.4	54.0	18.4	62.25	43.85
Synthetic Sprayed	19.0	45.5	26.5	19.0	58.4	39.4	19.0	71.3	52.3	19.0	63.6	44.6	19.0	59.7	40.7
Silk crepe (original reflectance, 81.0)															
Synthetic Padded	45.2	62.6	17.4	45.2	65.5	20.3	45.2	70.5	25.3	45.1	75.8	30.6	45.2	68.6	23.4
Vacuum Padded	37.4	67.9	30.5	37.4	66.5	29.1	37.4	76.5	39.1	37.4	76.0	38.6	37.4	71.7	34.3
Vacuum Immersed	33.6	60.5	29.6	33.6	61.4	27.8	33.6	71.0	37.4	33.6	72.5	38.9	33.6	66.3	32.7
Synthetic Immersed	14.0	47.9	33.9	14.0	53.5	39.5	14.0	65.8	51.8	14.0	72.7	58.7	14.0	59.9	45.9
Synthetic Sprayed	12.7	39.7	27.0	12.7	45.9	33.2	12.7	59.6	46.9	12.7	67.6	54.9	12.7	53.2	40.5
Cotton broadcloth (mercerized) (original reflectance, 83.4)															
Synthetic Padded	56.6	77.5	20.7	56.6	78.0	21.4	56.6	71.9	15.3	56.6	77.5	20.9	56.6	76.2	19.6
Vacuum Padded	45.5	73.8	28.5	45.3	74.6	29.3	45.5	74.8	29.3	45.5	76.7	31.2	45.5	75.0	29.5
Vacuum Immersed	37.7	65.6	27.9	37.7	69.2	31.5	37.7	68.5	30.8	37.7	72.9	35.2	37.7	69.1	31.4
Synthetic Immersed	21.1	63.9	42.8	21.1	61.4	40.3	21.1	62.7	41.6	21.1	68.5	47.4	21.1	64.1	43.0
Synthetic Sprayed	7.6	43.3	35.7	7.6	31.8	24.2	7.6	44.8	37.2	7.6	50.8	43.2	7.6	42.7	35.1
Cotton Indian Head fabric (original reflectance, 83.0)															
Synthetic Padded	41.6	65.9	24.3	41.6	66.5	24.9	41.6	63.4	21.8	41.6	69.7	28.1	41.6	66.4	24.8
Vacuum Padded	31.8	67.7	35.9	31.8	68.5	36.7	31.8	67.0	35.2	31.8	67.0	35.2	31.8	62.5	35.7
Vacuum Immersed	36.2	54.5	18.3	36.2	59.8	23.6	36.2	65.3	29.1	36.2	63.1	26.9	36.2	60.7	24.5
Synthetic Immersed	16.2	46.9	30.7	16.2	39.7	23.5	16.2	44.6	28.4	16.2	56.6	40.4	16.2	47.0	30.8
Synthetic Sprayed	9.9	36.2	26.3	9.9	32.1	22.2	9.9	44.0	34.1	9.9	50.8	40.9	9.9	40.8	30.9
Woolen fabric shrinkproofed with Lanzset (original reflectance, 61.9)															
Synthetic Padded	25.7	51.8	26.1	25.7	45.8	20.1	25.7	58.9	33.2	25.7	54.7	29.0	25.7	52.8	28.1
Vacuum Padded	25.7	43.1	17.4	25.7	31.8	6.1	25.7	57.2	31.5	25.7	54.3	28.6	25.7	46.6	20.9
Vacuum Immersed	29.1	43.0	13.9	29.1	48.6	19.5	29.1	55.5	26.4	29.1	52.7	23.6	29.1	50.0	20.9
Synthetic Immersed	7.2	14.2	7.0	7.2	21.8	14.6	7.2	21.4	14.2	7.2	39.9	32.7	7.2	24.3	17.1
Synthetic Sprayed	17.3	19.9	2.6	17.3	20.1	2.8	17.3	43.1	25.8	17.3	26.7	9.4	17.3	27.5	10.2
Nylon 2-bar tricot (original reflectance, 77.8)															
Synthetic Padded	27.2	75.7	48.5	27.2	74.0	46.8	27.2	75.3	48.1	27.2	78.4	51.2	27.2	75.9	48.7
Vacuum Padded	28.3	77.4	49.1	28.3	76.5	48.2	28.3	77.5	49.2	28.3	75.1	46.8	28.3	76.6	48.3
Vacuum Immersed	32.8	72.6	39.8	32.8	73.6	40.8	32.8	75.9	43.1	32.8	75.9	43.1	32.8	74.5	41.7
Synthetic Immersed	10.5	47.4	36.9	10.5	49.8	39.3	10.5	49.6	39.1	10.5	72.0	61.5	10.5	54.7	44.2
Synthetic Sprayed	13.3	52.0	38.7	13.3	55.2	41.9	13.3	62.8	49.5	13.3	72.5	59.2	13.3	50.6	47.3
Filament-Dacron shirting (original reflectance, 67.7)															
Synthetic Padded	49.0	71.0	22.0	49.0	74.5	25.5	49.0	71.9	22.9	49.0	70.7	21.7	49.0	72.0	23.0
Vacuum Padded	48.1	75.1	27.0	48.1	76.0	27.9	48.1	74.5	26.4	48.1	74.9	26.8	48.1	75.1	27.0
Vacuum Immersed	43.4	72.7	29.3	43.4	73.7	30.3	43.4	70.3	26.9	43.4	70.9	27.5	43.4	71.9	28.5
Synthetic Immersed	21.3	50.4	29.1	21.3	58.1	36.8	21.3	48.3	27.0	21.3	53.0	21.7	21.3	52.4	31.1
Synthetic Sprayed	8.2	25.7	17.5	8.2	35.7	27.5	8.2	35.3	27.1	8.2	32.2	24.0	8.2	32.2	24.0
Spun-Dacron shirting (original reflectance, 69.5)															
Synthetic Padded	44.2	74.1	29.9	44.2	74.1	29.9	44.2	74.7	30.5	44.2	75.5	31.3	44.2	74.6	30.4
Vacuum Padded	36.5	74.1	27.6	36.5	74.5	38.0	36.5	73.7	37.2	36.5	74.9	38.4	36.5	74.3	37.8
Vacuum Immersed	33.4	68.9	35.5	33.4	70.0	36.6	33.4	70.8	37.4	33.4	71.9	38.5	33.4	74.0	37.0
Synthetic Immersed	16.2	51.5	35.3	16.2	56.8	40.6	16.2	41.9	25.7	16.2	60.8	44.6	16.2	52.75	36.55
Synthetic Sprayed	7.3	27.7	20.4	7.3	37.2	29.9	7.3	36.5	29.2	7.3	44.6	37.3	7.3	36.5	29.2
Filament-nylon shirting (original reflectance, 86.0)															
Synthetic Padded	49.9	78.3	28.4	49.9	78.9	29.0	49.9	85.0	35.1	49.9	83.5	33.6	49.9	81.4	31.5
Vacuum Padded	52.3	80.8	28.5	52.8	81.0	28.2	52.3	83.7	31.4	52.3	88.4	36.1	52.3	83.5	21.2
Vacuum Immersed	37.7	77.4	39.7	37.7	78.6	40.9	37.7	83.1	45.4	37.7	86.1	48.4	37.7	81.3	43.6
Synthetic Immersed	21.7	58.0	36.3	21.7	60.8	39.0	21.7	57.9	36.2	21.7	70.8	49.1	21.7	61.9	40.2
Synthetic Sprayed	8.4	36.3	27.9	8.4	38.1	29.7	8.4	40.6	32.2	8.4	55.0	46.6	8.4	42.5	34.1
Spun-nylon blouse (original reflectance, 74.6)															
Synthetic Padded	33.0	58.6	25.6	33.0	63.3	30.3	33.0	64.3	31.3	33.0	66.0	33.0	33.0	63.1	30.1
Vacuum Padded	24.6	59.7	35.1	24.6	61.2	36.6	24.6	64.0	39.4	24.6	64.4	39.8	24.6	62.3	37.7
Vacuum Immersed	23.4	49.9	26.5	23.4	52.5	29.1	23.4	57.1	33.7	23.4	62.5	39.1	23.4	55.5	32.1
Synthetic Immersed	9.4	25.9	16.5	9.4	32.9	23.5	9.4	38.0	28.6	9.4	47.4	38.0	9.4	36.1	26.7
Synthetic Sprayed	8.0	13.5	5.5	8.0	15.2	7.2	8.0	26.1	18.1	8.0	34.8	26.8	8.0	22.4	14.4
Filament-Orlon shirting (original reflectance, 81.8)															
Synthetic Padded	49.1	83.8	34.7	49.1	84.8	35.7	49.1	82.1	33.0	49.1	85.3	36.2	49.1	84.0	34.9
Vacuum Padded	46.1	83.7	37.6	46.1	83.4	37.3	46.1	83.9	37.8	46.1	84.1	38.0	46.1	83.8	37.7
Vacuum Immersed	40.1	81.4	41.3	40.1	81.0	40.9	40.1	79.9	39.8	40.1	81.5	41.4	40.1	81.0	40.9
Synthetic Immersed	10.1	58.8	48.7	10.1	56.5	46.4	10.1	61.5	51.4	10.1	69.1	59.0	10.1	61.5	51.4
Synthetic Sprayed	9.1	46.3	37.2	9.1	57.2	48.1	9.1	52.9	43.8	9.1	59.9	50.8	9.1	54.1	45.0
Spun-Orlon shirting (original reflectance, 79.1)															
Synthetic Padded	37.2	41.6	4.4	37.2	55.6	18.4	37.2	61.9	24.7	37.2	63.2	26.0	37.2	55.6	18.4
Vacuum Padded	38.1	67.9	29.8	38.1	72.8	34.7	38.1	75.3	37.2	38.1	77.5	89.4	38.1	73.4	35.3
Vacuum Immersed	28.7	53.1	24.4	28.7	58.6	29.9	28.7	62.0	33.3	28.7	66.5	37.8	28.7	60.1	31.4
Synthetic Immersed	10.1	27.6	17.5	10.1	31.4	21.3	10.1	28.8	18.7	10.1	35.2	25.1	10.1	30.8	20.7
Synthetic Sprayed	8.2	19.1	10.9	8.2	21.6	13.4	8.2	22.7	14.5	8.2	28.7	20.5	8.2	23.0	14.8
Spun-viscose gabardine—no finish (original reflectance, 81.6)															
Synthetic Padded	20.2	52.2	31.0	20.2	50.0	29.8	20.2	50.2	30.0	20.2	55.4	35.2	20.2	51.7	31.5
Vacuum Padded	30.7	66.0	35.3	30.7	64.7	34.0	30.7	62.9	32.2	30.7	65.8	35.1	30.7	64.9	34.2
Vacuum Immersed	39.2	63.2	24.0	39.2	62.3	23.1	39.2	65.2	26.0	39.2	66.3	27.1	39.2	64.3	25.1
Synthetic Immersed	21.1	49.0	27.9	21.1	40.4	25.3	21.1	55.8	34.7	21.1	61.2	40.1	21.1	53.1	32.0
Synthetic Sprayed	17.8	49.3	31.5	17.8	48.9	31.1	17.8	49.9	32.1	17.8	44.6	26.8	17.8	38.2	30.4
Spun-viscose gabardine-resin finished (original reflectance, 80.7)															
Synthetic Padded	27.7	57.5	29.8	27.7	72.1	44.4	27.7	71.5	43.8	27.7	75.3	47.6	27.7	69.2	41.5
Vacuum Padded	33.0	73.2	40.2	33.0	74.2	41.2	33.0	71.3	38.3	33.0	74.7	41.7	33.0	73.4	40.4
Vacuum Immersed	35.6	63.9	28.3	35.6	66.5	30.9	35.6	66.8	31.2	35.6	71.6	36.0	35.6	67.2	31.6
Synthetic Immersed	19.1	37.7	18.6	19.1	53.3	34.2	19.1	57.4	38.3	19.1	73.7	54.6	19.1	55.5	36.4
Synthetic Sprayed	23.0	40.5	17.5	23.0	61.3	38.3	23.0	60.5	37.5	23.0	68.0	45.0	23.0	57.6	34.6

* Reflectance readings after soiling
** Reflectance readings after washing

The listing was developed by ranking the fifteen fabrics in order of soil pickup by each of the five variations in soil application. These rankings were computed to give an over-all grading for each fabric. Data are contained in Table II. It will be noted that certain fabrics appear out of place in the listing. It would be expected, for example, that the Orlon-filament shirting would be nearer the bottom of the list. These inconsistencies are attributed to unexpected surface effects in the cloth, which might be produced by the finishing treatment or the particular weave. It is logical to expect that spun fibers will produce fabrics that have more tendency to enmesh and hold soil than would be true of a filament fabric. It is therefore not surprising that the spun fibers retain the greatest amount of soil while the filament fibers are least soiled under the same conditions.

Table III gives a few preliminary data concerning the application of vacuum-cleaner-dust soil and synthetic soil to selected fabrics on a laboratory printing machine. The soil was applied as an aqueous paste and, in the case of vacuum-cleaner-dust soil, corn starch was added to give the paste the desired consistency.

The data on printing show little correlation with the other methods of soil application with respect to the reflectance

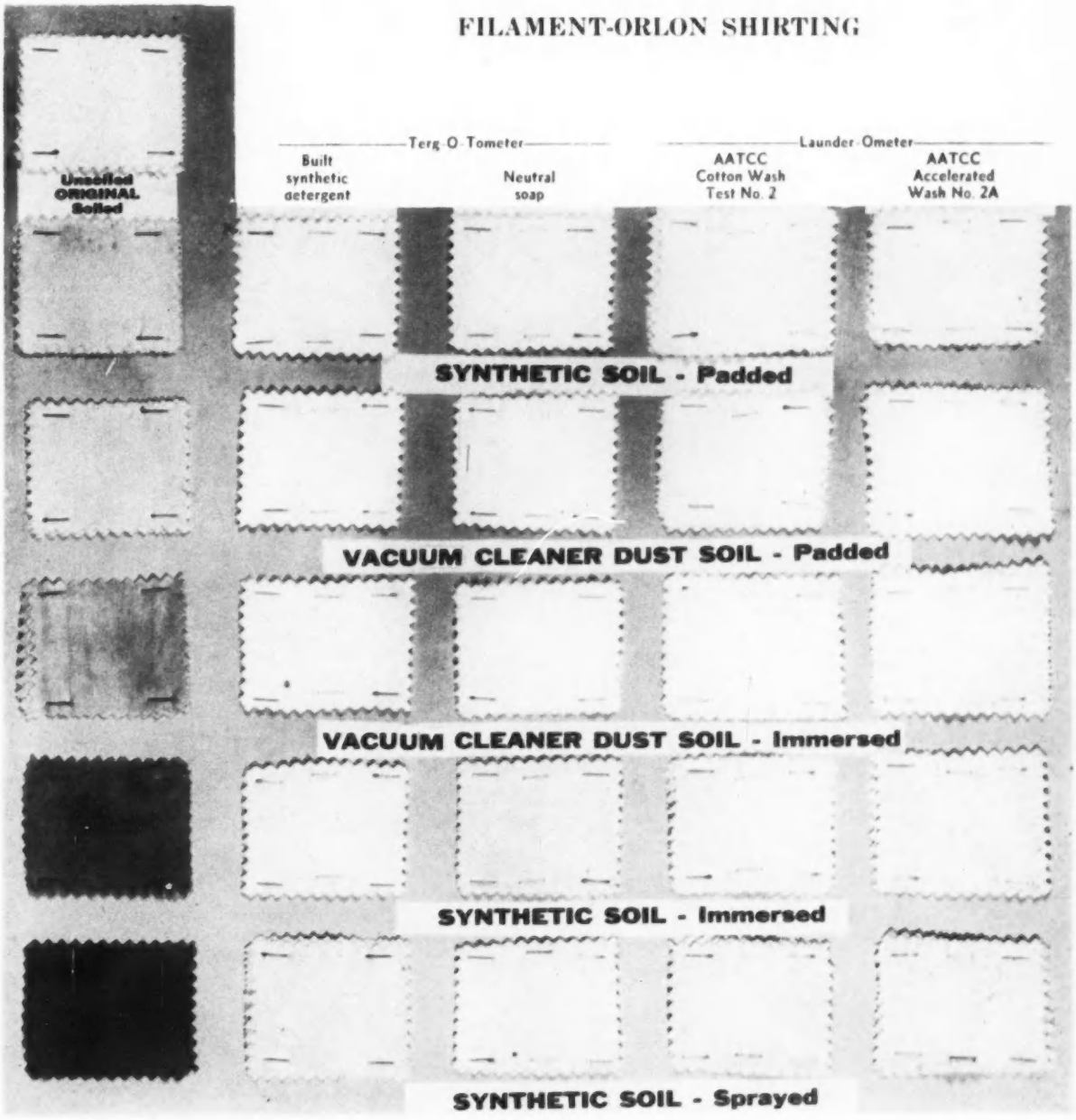

Figure 4

of the fabrics after soiling and the ease with which the soil is removed by washing. Soiling by this method is undoubtably influenced to a large extent by the surface construction of the fabric. Because of this and the difficulty in applying the soil by the printing method, it was decided to eliminate this technique of soiling from the study.

The data in Table IV show the increase in reflectance of the soiled fabric swatches after they were washed by four different methods. In the development of the test method, certain data were obtained from which a few broad observations can be made. The effectiveness of soil removal as measured in the Terg-O-Tometer is in broad agreement with results obtained using the Launder-Ometer. Moreover, washing with a built synthetic detergent or an unbuilt soap in the Terg-O-Tometer, or washing according to AATCC Standard Test Methods 36-54, Test II and 61-54, Test 2A in the Launder-Ometer had no significant effect on the relative washing characteristics of the soiled fabrics.

In general, the filament fibers release soil more easily in washing than do the spun fibers and, as was true in the case of soil adherence, cotton broadcloth and cotton Indian Head fell roughly into the center of the grouping. Listed below are

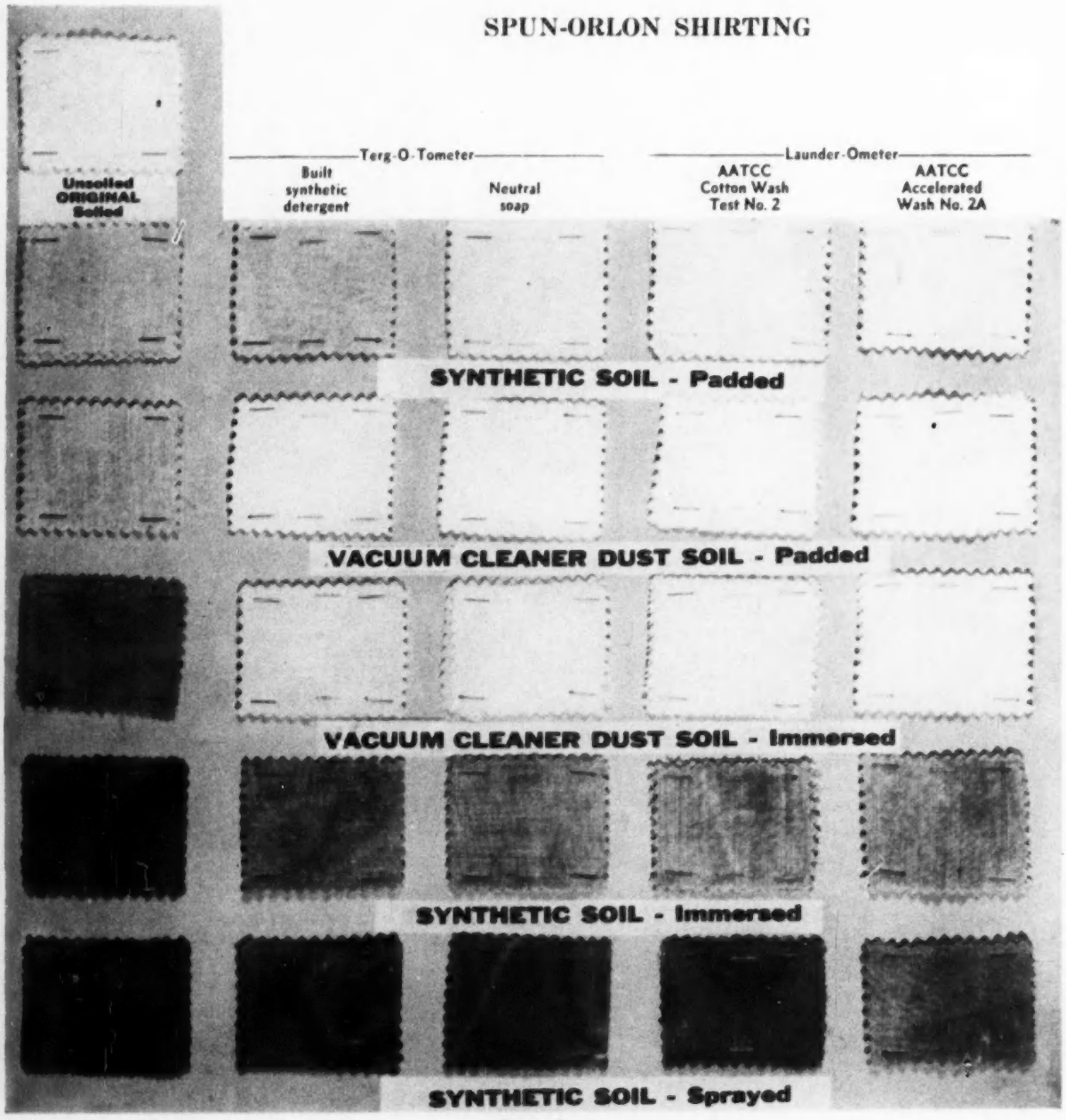

Figure 5

the fifteen fabrics, arranged in order of ease with which soil may be removed, with the fabrics which held the soil most tenaciously at the top of the list.

wool (Lanaset-treated)
spun-Orlon shirting
spun-viscose gabardine — acetate warp, rayon fill
filament-Dacron shirting
spun-nylon blouse
cotton Indian Head
spun-viscose gabardine — no finish
cotton broadcloth
filament-nylon shirting
spun-Dacron shirting
silk crepe
bright filament-acetate taffeta
spun-viscose gabardine — resin finish
filament-Orlon shirting
2-bar nylon tricot

The fact that the filament fibers showed a greater increase in reflectance after washing than did the spun fibers is interesting from another point of view. The filament fibers are soiled the least by any of the soiling methods, and the removal of soil in the washing process leaves these fabrics very close to their original whiteness. The spun fabrics, starting at a much lower reflectance level, are still heavily soiled after washing. It is generally agreed that it is most difficult to remove the last traces of soil from cloth, or in other words, to approach the maximum possible whiteness. This being the case, it would seem that the soil held by

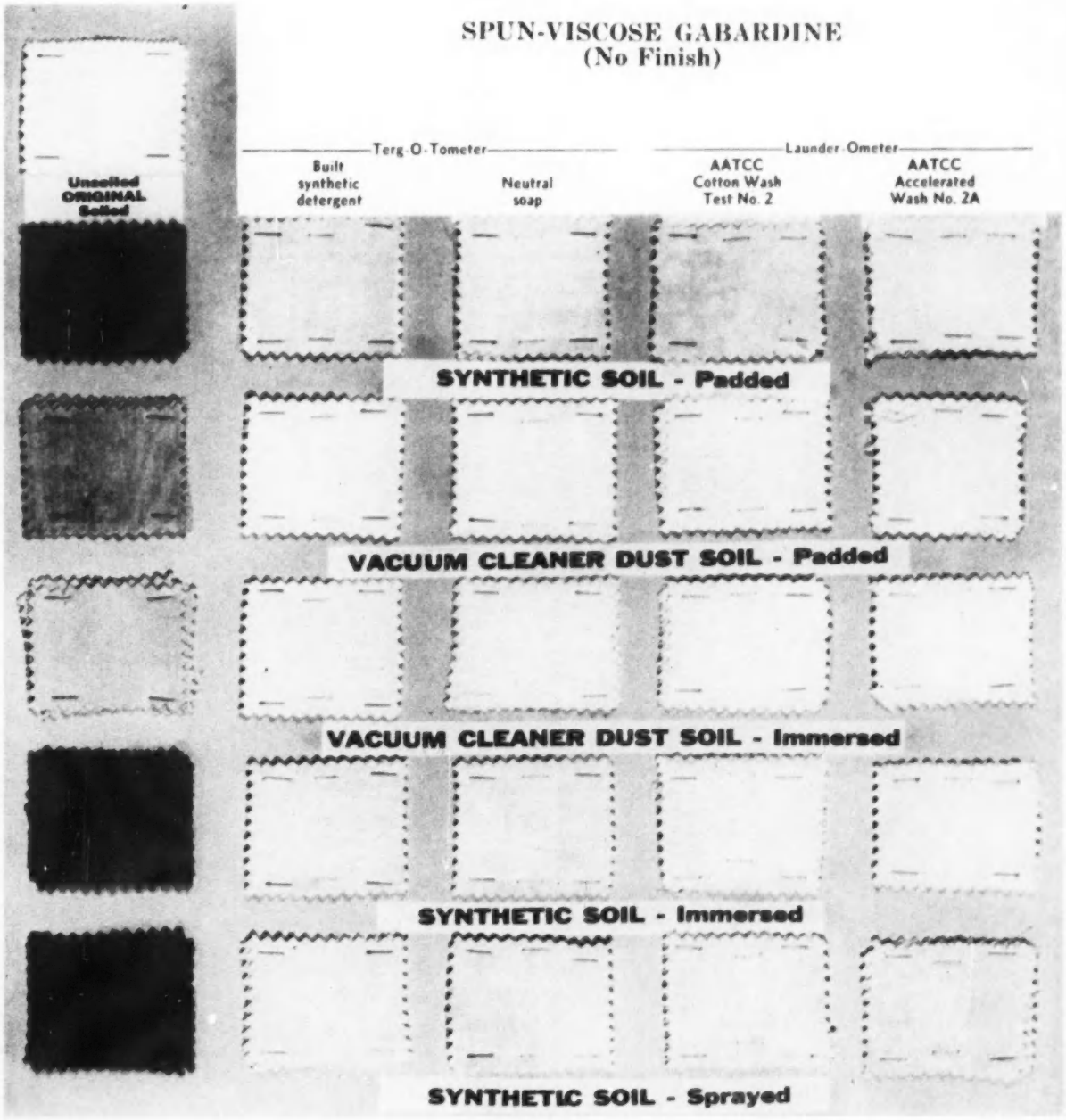

Figure 6

the spun fabrics is very tightly bound while the soil held by the filament fibers is more lightly attached than would be obvious from the reflectance readings.

It is also interesting to note that in about 70% of the washing tests the soiled fabrics were washed slightly cleaner by soap in the Terg-O-Tometer than by a built synthetic detergent under the same washing conditions. The differences in magnitude were slight, however, and for all practical purposes the synthetic detergent and the unbuilt soap were approximately equivalent in soil-removal effectiveness.

Figures 4-7 show mounts used in the actual tests.

MICROSCOPICAL EXAMINATION OF SOILED FABRICS——The microscope is another tool by which the soiling characteristics of a fiber or a fabric may be studied. This method does not give quantitative results but can yield much information as to how the soil is picked up and what happens to it when a fabric is washed. Frequently there are individual fibers which are sufficiently separated from the fabric yarns so that the soiling characteristics of the fibers themselves as well as the soiling characteristics of the woven fabric can be studied.

A number of the fabrics, which had

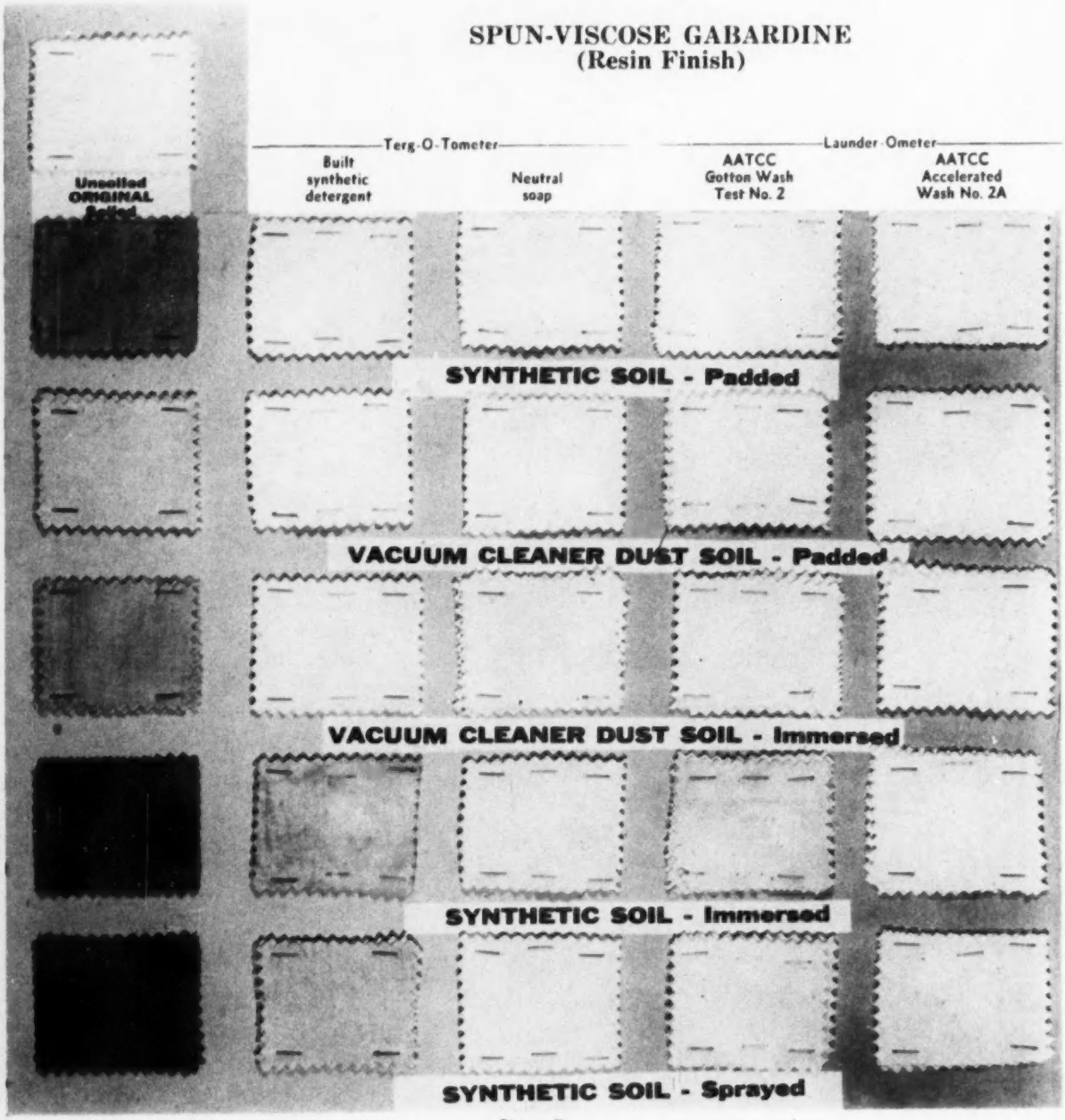

Figure 7

Figure 8
Photomicrographs of soiled Orlon fabrics

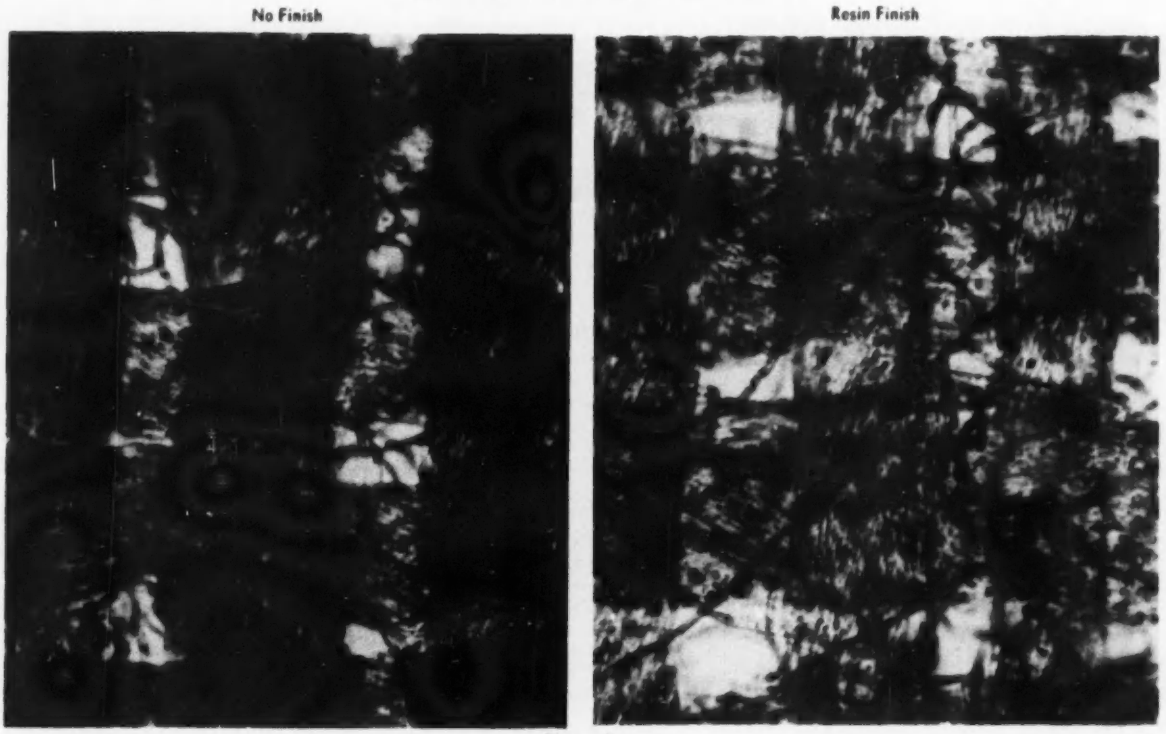

Figure 9
Photomicrographs of soiled viscose rayon fabric

been soiled with the synthetic soil by the immersion method and washed in the Terg-O-Tometer with a built soap, were observed in the soiled state and after washing. These studies indicated that each fiber and fabric had distinct, individual properties with regard to both soiling and soil removal by washing.

The penetration of the soil and the distribution of the soil with respect to particle size and with respect to the fabric structure can be readily observed. The microscopical examinations indicated that the same soil applied in the same manner to different fabrics goes on differently as to both location and apparent average particle size. Some of the fabrics retained very few of the larger soil particles while others held a relatively large fraction of the soil in this form. The same conditions apply to the washed samples. These observations make all the more evident the difficulties in accurately calculating actual or effective soil content from reflectance measurements.

Illustrations of the appearance of selected soiled fabrics before washing are shown in Figures 8 and 9.

SUMMARY AND CONCLUSIONS

A test method has been developed for evaluating the aqueous soiling characteristics of selected fabrics both as to their ability to take up soil and to retain it during a washing operation.

A vacuum-cleaner-dust soil and a synthetic soil were applied to the fabrics by spraying, padding, and long liquor immersion, respectively. In general the synthetic soil applied by a spraying method gave the heaviest soiling, which was the most difficult to remove by a washing procedure. The synthetic soil applied by an immersion method gave the next heaviest soiling, while the synthetic soil applied by padding gave the lowest amount of adherent soil. The vacuum-cleaner-dust soil generally gave slightly heavier soiling when applied by a long liquor immersion method as compared with the padding method of application. The vacuum-cleaner-dust soil was not applied by spraying.

The type of fiber and the physical construction of the fabric and surface treatments influenced the amount of soil retained through any soiling treatment, and also, the tendency of the soil to adhere to the fabric during washing. Spun yarns in general picked up more soil than the filament yarns, and held the soil to a greater degree during washing.

The data likewise indicated that the wash tests can be made in either the Terg-O-Tometer or Launder-Ometer with satisfactory results, although similar washings showed that the Launder-Ometer removed more soil than did the Terg-O-Tometer. Approximately the same results were obtained in Terg-O-Tometer wash tests with either a built synthetic detergent or a neutral soap.

ACKNOWLEDGMENTS

The Committee wishes to express its appreciation to the following concerns for supplying the fabrics used in carrying out the soiling tests: American Cyanamid Co; Antara Chemicals, Div of General Aniline & Film Corp; J P Stevens & Co; Textile Fibers Dept, Carbide and Carbon Chemicals Co, a Division of Union Carbide and Carbon Corp; United Merchants Laboratories, Inc; and Waldrich Co.

The Committee likewise expresses gratitude to Lever Brothers Co, Inc and Alexander Smith, Inc for supplying the standard soils; the microscopical laboratory of the American Cyanamid Co for photomicrographs of soiled fabrics; and Colgate-Palmolive Co for the many reflectance measurements required during the study.

The chairman in particular wishes to thank those members of the Committee who gave many hours of their time both in carrying out the experimental work and in writing the paper.

REFERENCES

(1) Astrom A, *Svensk Kem Tib*, 1941 190-203 (1929); *Chem Abst*, 1780-3 (1930).
(2) Kruger, P, *Seitung des Textile-Ind*, 1939, 221 (1936); *Chem Abst*, 4327-9 (1936).
(3) Masland, C H, *Rayon Textile Monthly* (Oct-Nov, 1939).
(4) Leonard, E A, *Nat Rug Cleaner* 22, 16 (April, 1949).
(5) Leonard, E A, *Soap San Chemicals* 26, 42 (1950).
(6) New York Section, AATCC, *Am Dyestuff Reptr* 41, 322-8 (1952).
(7) Utermohlen, W P, Jr, and Wallace, E L, *Textile Research J* 17, 670 (Dec, 1947).
(8) Utermohlen, W P, Jr, Fisher, F K, Ryan, M E, and Campbell, C H, *ibid* 19, 489 (1949).
(9) Utermohlen, W P, Jr, *Am Dyestuff Reptr* 39, 262 (1950).
(10) Utermohlen, W P, Jr, Ryan, M E, Young, D O, *Textile Research J* 21, 510 (1951).
(11) Compton, J, and Hart, W J, *Ind Eng Chem* 43, 1164 (1951).
(12) Compton, J, and Hart, W J, *Textile Research J* 23, 158 (1953).
(13) Hart, W J, and Compton, J, *ibid* 23, 164 (1953).
(14) Weatherburn and Bayley, *ibid* 25, 549 (1955).
(15) Hunter, R S, *U S Dept of Commerce, Nat Bur Standards Circ C 249* (1942).
(16) Judd, D B, "Specification of Color Differences at the NBS", *Am J Psychology* 52, 418 (1939).
(17) Diaz, R B, Paitchel, H, and Woodhead, J A, "Need for Standardized Procedure for Measuring Detergency Fabrics", ASTM Bull No. 202 (Dec, 1954).
(18) Lambert, J M, and Sanders, H L, *Ind Eng Chem* 42, 1388-94 (1950).
(19) Kubelka, P, and Munk, F, *Z Tech Phys* 12, 593-601 (1931).
(20) Hart, W J, and Compton, J, *Textile Research J* 23, 412-23 (1953).
(21) Studer, C W, "Carpet Dirt Research", Hoover Vacuum Cleaning Co, North Canton, Ohio.
(22) Florio, P A, and Mersereau, E P, *Textile Research J* 25, 641-9 (1955).
(23) Sanders, H L, and Lambert, J M, *J Am Oil Chemists' Soc* 27, 153-9 (1950).
(24) 1955 Technical Manual and Year Book of the AATCC XXXI, 54-8, Howes Publishing Co, Inc (New York).
(25) ASTM Committee D-12, Subcommittee D-5 (Mar 22-23, 1949).

EMPLOYMENT REGISTER

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55-31

Education: BS, textile chemistry and dyeing.

Experience: textile chemist; salesman, finishing agents, resins, silicones; dyer.

Age: 34; veteran, flying officer; married; references; position in laboratory or sales, near Boston, preferred.

11-21, 12-5

55-32

Education: BS with honors, textile chemistry and dyeing.

Experience: chemist.

Age: 34; married; references; position in research and development desired, location not restricted.

11-21, 12-5

53-33

Education: BS, textile chemistry, dyeing and finishing.

Experience: laboratory chemist with mill contacts.

Age: 27; single; references; position as textile chemist desired, in vicinity of New York City.

11-21, 12-5

Pacific Southwest and New York Sections——

THE PRESENT-DAY SALESMAN AND HIS RELATIONSHIP WITH THE BUYER*

JOSEPH B EVANS
Dexter Chemical Corp
New York, N Y

The author calls attention to the role of the salesman in the present-day affairs of AATCC, after which, in a light vein, he classifies the various salesman and buyer types.

INTRODUCTION

I WOULD like to compliment our program chairman for his courage, since, in inviting a speaker of my type, one who is not here to discuss technical problems, he is deviating from what has been considered normal practice at AATCC sectional meetings.

The AATCC was formed in the early 1920's. The objectives were clearly stated. Our Year Book lists them as follows:

1) To promote increase of knowledge of application of dyes and chemicals in the textile industry.

2) To encourage in any practical way research work on chemical processes and materials of importance to the textile industry.

3) To establish for the members channels by which the interchange of professional knowledge among them may be increased.

The founders were primarily concerned with the technical aspects of our industry. They could not very well have anticipated the rapid growth both geographically or numerically that this organization has had. However, I am led to believe by the broadness of the third purpose that they knew that, as this organization grew, people other than technical men would be active participants.

As many of us know, certain groups have been critical of the fact that the salesman has become such an active segment of AATCC, but in my opinion the salesman represents a real, important arm of this Association. I can't conceive of a better "channel" through which the interchange of professional knowledge referred to in the aims of the Association can be funneled.

The salesman has many problems, most of which involve relations with his fellow members, who hold positions as technical men, dyers and purchasing agents. Where then is there a better place to discuss his problems than at an AATCC meeting, where all the persons involved are present?

This evening let's evaluate together the present-day salesman and discuss his relationship with the buyer. I, like many of you, have had experience on both sides of the desk.

There are many problems involved in this relationship. I believe that we all know something about them, yet, haven't attached much importance to or given them the proper consideration.

THE SALESMAN

At this point let's trace the birth and the history of the Great American Salesman by starting with the period prior to the 20th Century when the distribution of commodities, without the need for persuasive selling, was the normal thing. Our country needed everything that it manufactured, and the big problem was to produce enough material to maintain us and to help us to expand. As time went on, with our productive capacity constantly increasing, persuasive selling steadily became a very important factor and so "The Great American Salesman" was born.

I guess that most of us remember this figure, who was so often caricatured as the hearty back-slapper, the drummer with the funny stories and the free-wheeling knight of the road. He became a real necessity in our American economy, and while many jokes were made about him, he was a great guy.

His employers expected him to be, and he usually was, a man of vision and ambition, an after-dinner speaker, a before-and-after dinner guzzler, and a night owl who worked all day; an entertainer of customers, wives, sweethearts and stenos, without, of course, becoming too amorous. He was expected to inhale dust, drive through snow ten feet deep at ten degrees below and work all summer without perspiring or acquiring BO.

It was necessary for him to be a man's man, a ladies' man, a model husband, a fatherly father, a good provider, a plutocrat, Democrat, Republican, a technician, a politician, a mathematician and a mechanic. He had to be a sales promotion expert, a credit manager, and correspondent. He had to attend meetings, tournaments, funerals, weddings and visit customers in hospitals and jails. He, of course, had to contact all of his accounts at least every six weeks and in his spare time look for new business. He had to be an expert driver, talker, dancer, traveler, bridge player, poker hound, golfer, diplomat, financier, capitalist and philanthropist. He also had to be an authority on chemistry, psychology, dogs, cats, horses, blondes, brunettes and redheads.

This man's prestige was ever increasing and he became the fair-haired boy of every manufacturer of a commodity. He rode his mighty steed through the depression which started in 1929 and carried the nation on his back right up to World War II.

The opening of hostilities in Europe and our eventual entry into the biggest war in history brought material shortages, creating a situation in which the buyer tried to sell the salesman a reason for selling him. Manufacturers no longer needed his persuasive powers. Industry, which earlier had wholeheartedly accepted him, now all but disowned him. His prestige sank to a very low level.

At the war's end, as we slowly started back to normal, good salesmen were few and far between. Industry was not quick to realize that their products once again would have to be sold, and the men returning from the war did not realize the true potential of sales work as a career. Many of the good old-time salesmen had gone into different phases of industrial work where the demand was very great because of manpower shortages.

Our production today, however, far ex-

* Presented before the Pacific Southwest Section on January 29, 1954 at the Gourmet Restaurant, Beverly Hills, Calif. and before the New York Section on March 18, 1955 at Kohler's Swiss Chalet, Rochelle Park, N J.

ceeds our normal requirements and this condition, according to a majority of our government economists, will continue to grow, provided, of course, there is no major war.

They tell us that by 1975 industry will be turning out 40 percent more hard goods, and that the production of machinery and industrial equipment will increase 50 percent. The consumption of electric power will be 3½ times what it is now, and the telephones in use will jump from the present 48 million to 60 or 70 million. All this material and services too will have to be sold. There will be a constantly growing need for good salesmen.

In the ten years since the war's end slowly but surely an increasing number of men from all walks of life have wisely come to the realization that selling is a real profession, a calling of dignity and a wonderful self-satisfying way to make a living.

Selling, in my opinion, is a wonderful profession and I believe that the salesman today holds the key to our present and future prosperity.

Distribution of facts as well as goods is the problem in our country. *Selling* of principles as well as products is the solution.

This is a century of selling, and we who are the salesmen can well be proud to be members of such an important profession. We can find comfort and satisfaction in knowing that, by doing our jobs well, we are helping others as well as ourselves. We can hold our heads high through the realization that the more sales we make, the more people are in jobs. Jobs create greater purchasing power: purchasing power leads to wider markets: wider markets require greater production —all this leads to greater prosperity.

Charles Lipscomb, Jr, president of Pepsodent Company, put it very well, I think, when he said that if it weren't for salesmen we would still be keeping milk and butter in the spring house and shivering out to the backhouse in the cold winter months.

Unlike the salesman of old, who had little opportunity for formal education and sales training, the salesman of today has a better opportunity to do a real job if he has the will. He is offered good training facilities, is paid better, and is recognized by his employers, customers and community as a man of standing. Most salesmen today are selling because they like selling, and they have chosen it as their life's work because they understand its many advantages.

I believe that it is very obvious to all of us that, despite the opportunities for men to learn how to sell properly, there still exist mediocre salesmen as well as good ones. I am sure that you all know the common faults of the bad salesman. However, I feel that it would be well to point out at this time some of the common failings and some of the possible reasons therefore. Statistically, 20 percent of the salesmen do 80 percent of the volume and the other 80 percent of the salesmen are fellows who are making the mistakes. Among this 80 percent there are many men who should never have been in sales work at all. Against this, unfortunately, there are very many men working in other jobs who have not analyzed themselves and recognized their wonderful potential for sales work.

Before entering the field it is important that men analyze themselves and their own personalities in order to determine for themselves whether they would fit physically and mentally into the sales picture. It is also very important for industry to have a guide by which to determine whether a man has all the qualities necessary for sales work.

There are many thousands of men engaged in sales work today who are not really incompetent, but who are just not temperamentally fit for the type of work they are doing. These men most probably have greater talents along other lines but are doing sales work only because they were led to it by circumstances and have not used sufficient self-analysis to be able to determine their fitness.

For example, too many men I have heard say, "Well, I'll try selling and if I am not successful I can always go back to the inside." This is the wrong approach to a career in sales, for self confidence is one of the major attributes of a good salesman.

Others in this unsuccessful group are temperamentally well qualified for sales work but have not been properly trained to use their full capabilities. Because of bad training, or lack of training, many of these have fallen into bad habits, and they use tactics which are obviously wrong and do not make for successful selling. I would like to mention and discuss four very typical classifications into which some of these men fall. There are the callmakers, the great haters, the high-pressure artist, and the cry baby. I am sure you know all of them well.

THE CALLMAKER——The callmaker does no research, takes little time to review his problems, and life to him is one call after the other with the ever-present hope that, if he makes enough calls, he will get an occasional order. We all know that, percentagewise, this is a bad gamble, and this man cannot be successful year in and year out.

THE GREAT HATER——The great hater is the fellow who spends the bulk of his time hating and knocking competitors.

This salesman has what is commonly referred to as a "hate complex." He blames his competitors for his own failures, and his accomplishments are measured in his own mind, not by how much he has done for himself or his own friends and customers, but by how much harm he has done to his competitor. This is not a creative method of selling and it is never really effective. This man, if he were smart, would realize that he owes a great deal to his competitor. Competition makes his job. It keeps him on his toes. He must learn that, in the long run, when he stops knocking his competitor and concentrates on the larger and more important constructive aspects of his work, he will sell more effectively. This man should keep repeating to himself five principles until he knows them by heart:

1) "My competitors do more for me than my friends do. My friends are too polite to point out my weaknesses, but my competitors go to great expense to advertise them."

2) "My competitors are efficient, diligent and attentive. They make me search for ways to improve my products and services."

3) "My competitors would take my business away from me, if they could. This keeps me alert to hold what I have."

4) "If I had no competitors I might be lazy, incompetent, inattentive. I need the discipline they enforce upon me."

5) "I salute my competitors. They have been good to me. God bless them all."

THE HIGH-PRESSURE ARTIST——Now we come to the high-pressure salesman. This man has great energy, terrific concentration and considerable ability. But unfortunately, his energy and ability are wasted or misused. The high-pressure method of selling has been discredited so completely that the slightest hint of such tactics puts a buyer on guard and creates an almost impossible hurdle. Of course there are still some indecisive buyers who can be backed into a corner and talked into an order, but today most buyers are generally well educated, alert and on their guard against any sort of pressure. The high-pressure salesman cannot be truly successful. He can get many a first order, but rarely does he get a repeat. He eventually gets himself into hot water because he talks too fast, promises too much and sooner or later is caught with (or without) the goods by his customer. The inevitable always happens with this man. He fails to build the future that is so important in selling.

THE CRY-BABY——Then there is the cry-baby. He's the fellow who is constantly seeking sympathy in hopes that he

will so emotionally affect the buyer that he must walk out with an order.

How many times have you buyers been faced by the guys whose job always depends on your particular order? This I must agree is a way of getting an order but not too many of them. It is, in my opinion, an imposition on the buyer's good nature and actually an insult to his intelligence.

THE IDEAL SALESMAN———At the top of the heap is, of course, the ideal salesman — the man who believes he is in the greatest profession there is. He has pride in his company, products and customers. He values the opportunity of serving his customers, and enjoys the friendships he develops. This man has caught the true spirit of selling.

He is among the true builders of better business. His purpose is to help his customers and prospects solve the problems which are worrying them most. True — he is interested in getting an order — but of paramount importance in his whole thinking is working with and keeping a customer. This man knows that if he helps his customers succeed with their problems, *he* must succeed. It is obvious that he has more than a skin-deep interest in his work — he loves it and lives for it. Rest assured, he recognizes that knocking competitors, using high-pressure tactics and blaming anyone else but himself for failures is the wrong way to operate.

He *does* have problems, however. He certainly runs up against many difficult types of buyer — as many difficult types as will be found among salesmen.

This does not faze the real salesman. He knows and likes people, and he therefore recognizes them for what they are and acts accordingly.

I would like to identify certain types of buyers as seen through the eyes of the salesmen. I hope that none of you fall into any of the mentioned categories. However, if by chance there is one who does, I most certainly hope that he will take no offense, but will accept my comments in the spirit in which they are given, and, incidentally, mend his ways.

THE BUYER

The real salesman is quick to identify the various personalities of his buyers. He recognizes almost at sight the know-it-all; the skeptic; the thinker; the changeable type; the prejudiced type; the indifferent type and the yes-man, whom we commonly refer to as the "kiss-me-in-kiss-me-out" type.

All buyers, while they present a definite problem, can be sold, particularly if they are recognized and understood.

THE EGOTIST———How many times have we salesmen complimented the egotist on his ideas although we knew down deep in our heart that the man was not right? How many times have we said to ourselves that we must make this fellow feel that he is a man of importance if we want to sell him? This may sound insincere, gentlemen, but these are the little harmless "white lies" of salesmanship.

THE SKEPTIC———When faced by the skeptic, who doubts everything a salesman says about himself, his products or his company, the approach of a good salesman must be conservative, sincere and very simple. He must force himself to use understatement, and in the final analysis he tries to show the customer that confidence is the basis of mutual relationship.

THE THINKER———Now we come to the thinker, who is slow and can never be rushed into decisions. He wants facts and he wants time to think about them. We give him facts and we give him all the time he feels he requires. High pressuring gets nowhere with this man but complete understanding of his personality does.

THE CHANGEABLE TYPE———The changeable type of buyer presents a very difficult hurdle. He agrees with you one minute and disagrees the next. This is the fellow on whom we generally use a little dynamite, but the big problem always is to figure out how and at what time to touch off the fuse.

THE YES-MAN———The kiss-me-in-kiss-me-out type always seems easy, but in my opinion he is the fellow who is the most difficult to sell. He's always friendly, always glad to see you, and will sit for hours discussing *his* problems. How many times have we spent almost half a day listening to the stories about his children, his wife, his boss, his home, without even an opportunity to discuss our product. He's a very friendly guy, and one who really never intends to do any harm; but he, because of his outward display of friendliness, has made many an inexperienced salesman wire to the home office assuring the sales manager that the account was in the bag. As a result of experience, however, I know that this fellow is a very tough nut to crack.

There is a story about the salesman who was calling on Mr Smith for a long time, but was never able to get an order. Mr Smith was a typical "kiss-me-in-kiss-me-out" type of buyer. Each time the salesman left, he very courteously said, "Thank you very much, Mr Smith, for your time. I appreciate this very nice interview. I wish I had a hundred like you." This went on for a period of many years and finally Mr Smith one day said, "Now, look, Jones, you seem to be a pretty good guy. You've been coming in here for 15 years and I have never given you an order, but each time you leave you courteously tell me that you wish you had a hundred like me. What is this all about?" To which Jones replied, "Mr Smith, I have 300 like you and I wish I could reduce them in number."

Gentlemen, it seems almost unfair to me that some buyers place the entire responsibility on the salesman. True — it is the salesman's job to sell his products, but on the other hand, it is also the responsibility of the buyer to buy those products which are the best and most efficient for his company. A good buyer, then, never adopts the attitude of "try to sell me." He cooperates with the salesman by explaining his specific needs and problems. I maintain that the success of a buyer can be measured by his sincerity and honesty in presenting the facts of his needs and problems. A salesman of any calibre, if handled in this manner, immediately becomes doubly conscious of his responsibilities towards his prospective customer and will do a better job.

If the buyer will look at the salesman, not as an adversary, but as a helping hand in solving his problems, I feel that the buyer's company will prosper through the consideration it will receive from the supplier.

Gentlemen, much can be accomplished for everyone concerned by the application of two simple principles — mutual cooperation and consideration.

In closing I would like to read to you a poem called "Turnabout" by William R Schaffstall.

For years I studied buyer types
And how to handle prospect's gripes
I mastered all the small details
That lead to more and better sales

My build-up and my trial close
Were picturesquely spoken prose
And all resistance disappeared
As sales I deftly engineered

I utilized approaches which
Enabled me to make a pitch
That added, to my bank account
Commissions in a large amount

But then a fateful die was thrown
An ulcer made its presence known!
So motivated by this quirk
I took up less demanding work

Alas! I'm closer now to death
For every day I feel the breath
Of salesmen breathing down my neck
I'm now a buyer—and a wreck!

REPORT OF THE STUDENT AWARD COMMITTEE

THE Student Award Committee is pleased to announce the recipients of the 1955 award of the American Association of Textile Chemists and Colorists. They represent schools which have student chapters of the AATCC.

Lowell Technological Institute	Mrs Nancy Geary Garvey
North Carolina State College	William Graham Crutchfield
Philadelphia Textile Institute	Wallace H Nuttall
New Bedford Institute of Textiles and Technology	Mrs Betsey Berg Gillin
Georgia Institute of Technology	John E Lancaster
Clemson College	Joseph F Mattison
Bradford Durfee Technical Institute	Francis A Flynn
Fairleigh Dickinson College	Marvin Eichenblatt
Rhode Island School of Design	Letitia F Meinhold

This award expresses the interest of the Association in a high standard of work in textile chemistry, since it is given to a graduating senior who has been selected by the faculty of each of the respective schools as having done the best work in textile chemistry over his or her entire college course.

In the past this honor list has been exclusively masculine, but it is a pleasure to welcome the young ladies who this year have received this recognition of work of exceptionally high quality. The award, as has been customary in the past, is in the form of a year's free membership in the Association, as well as a technical book in the field of the student's major interest, ie, textile chemistry. "The Physical Chemistry of Dyeing" by Vickerstaff was chosen by the committee from a list of books related to the above field, since it was felt that this type of book should be useful to each student for reference and further study.

The members of the committee feel sure that each member of our association wishes each recipient of this award much success in the ever-changing field of the chemical processing of textiles.

Respectfully submitted,

H C Chapin
Percival Theel
T R Smith
G H Wood
P J Wood
Joseph Lindsay, *Chairman*

AATCC Monograph No. 2
"THE APPLICATION OF VAT DYES"

"The group of fifteen editors responsible for this monograph consists of a well-balanced cross-section of American industry concerned with the production, marketing and application of vat dyes. The AATCC is to be congratulated on the production of a comprehensive survey of American vat dyeing and printing practice which is the major theme of this application . . . the book will be useful as a work of reference at this side of the Atlantic and as a working manual for the American colorists for whom it was designed. . . . If a clear account of American practice is required . . . the enquirer *must* have access to this volume."—*JOURNAL OF THE TEXTILE INSTITUTE* (England).

"This book . . . is abreast of the latest technical developments and research. Its value is increased because of the lack of books in this field today . . . we can readily recommend this book to all technical and practical men"—*MELLIAND TEXTILBERICHTE* (Germany)

$5.00, postpaid, to members
$6.00, postpaid, to nonmembers

SEND CHECK OR MONEY ORDER TO

"This monograph contains the work of many mill-experienced authors, plus good, sound chemical and application principles developed in the laboratories and mills enjoying AATCC membership. . . . This book puts between two covers much information that a dyer is constantly searching for. It is a good investment for any laboratory, dyehouse, or printshop."—*TEXTILE WORLD*.

". . . this monograph should be in the hands of every user of vat dyestuffs, every student and every teacher. The book is well indexed and includes valuable lists of equivalent trade names. It will certainly take its place as a standard book of reference."—*JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS* (England)

DR H C CHAPIN, SECRETARY, AATCC
PO BOX 28 • LOWELL, MASS

News of the Trade

• Wica Completes Latex Expansion

Wica Chemicals, Inc, Charlotte, N C, has completed its expansion program in the latex field, according to a recent announcement by William Caldwell, president.

In making the announcement, Mr Caldwell stated that expansion was made necessary because of increased demands for Wica's specialized developments of latex compounds. He said that, in the beginning, Wica, one of the oldest manufacturers of latex compounds, created methods for the use of latex compounds on flat goods and assisted in designing equipment for the use of these compounds. Wica's staff of specialists has developed individual compounds to meet the specific needs of many mills using the Wica latex.

The need was recognized for latex compounds with resistance to discoloration from light and heat, Mr Caldwell added, and Wica's specialists solved the problem. Wica's staff continues to serve the many mills on an individual basis.

The newly completed expansion program in the latex department includes, in addition to the production increase, new Wica trucks to serve the entire South with Wica Chemicals in the shortest possible time, Mr Caldwell said.

• NSP to Double Output at Meredosia

Increased demand for vinyl acetate resin has prompted National Starch Products Inc to double the capacity of its new Meredosia, Illinois, plant, which went into full production this past August.

Polyvinyl acetate emulsion, vinyl acetate copolymers and adhesives compounded from these resins are produced at NSP's Plainfield, N J, and Meredosia plants.

• Bradford Dyeing Moves N Y Office

After more than a quarter of a century at 40 Worth Street, Bradford Dyeing Association (USA) has moved its New York offices to 108 West 39th Street. According to Walter R Howell, executive vice president, the new quarters are nearly twice as large as those at previous location, and will contribute to greater efficiency and convenience for company and customers.

Bradford's dyeing and finishing plant is located in Westerly, R I.

THREE NEW MEMBERS OF GEIGY QUARTER CENTURY CLUB — (L to r): Doris Stricklin, F E Sprock, M Elizabeth Allinson.

• Geigy Quarter Century Club Initiates

The Geigy Quarter Century Club (America), which was created in 1938, recently initiated four members who had reached a quarter century of service with the Geigy Chemical Corporation. William F Zipse, after addressing a group of 43 members present from the farthest reaches of the United States and Canada, presented watches and the Club pins to Doris Stricklin, secretary, New York; F E Sprock, sales, Charlotte, and M Elizabeth Allinson, secretary, Philadelphia. Robert H Butler, sales, New England, also was honored although unable to attend because of illness.

The Club has a membership of 57 and includes 3 men who have devoted 50 years of their lives to the company: William F Zipse, president of the Corporation, who is still active, and R L Quinn and Joseph F Mauer, who retired in recent years.

• Krefeld Textile School Celebrating 100th Anniversary

A three-day program celebrating the 100th anniversary of one of the world's most famous textile schools — Textilingenieurschule Krefeld, Krefeld, Germany —will get underway on Thursday of this week.

Appropriate ceremonies and festivities will be held on campus and also in other areas of the city.

• 1956 Chemical Progress Week Set

The third annual Chemical Progress Week has been scheduled for April 23-28, 1956, according to an announcement made last month by the Manufacturing Chemists' Association, sponsor of the event.

"The purpose of the week," said General John E Hull, USA (Ret), MCA president, "is to bring home to the American people the significance of the chemical industry in terms of their daily life. In addition, we hope to establish a still closer working relationship between our industry and the schools with the hope of interesting more young men and young women in scientific and technical careers.

"We feel strongly that the best way to tell our story is to have the men and women who make up our industry talk directly to their friends and neighbors, particularly in chemical industry plant-communities. A review of the past two celebrations of Chemical Progress Week strengthens our conviction in this belief. We feel our efforts of the past two years have been productive. This year we hope to do even better."

The board of directors of the MCA, made up of senior industry executives, will once again serve as the sponsoring committee. The program will be national in scope with emphasis on local-level activities.

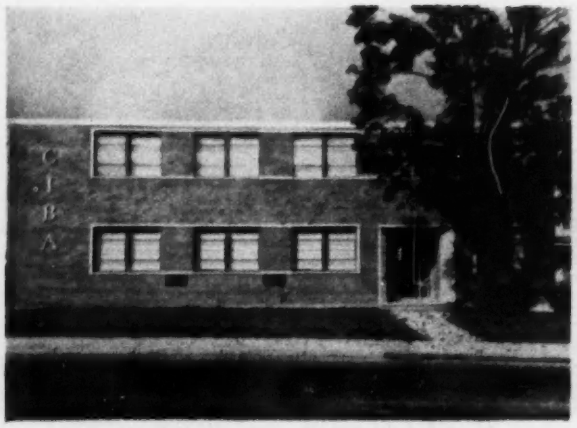
• Quaker City Club Meets

The "Kickoff Meeting" of the Quaker City Club of the Philadelphia Textile Institute Alumni Association was held Tuesday night, October 25th, at the Brewery Tavern, Philadelphia, Pa, with fifty-one members and guests attending the reception and a buffet dinner.

Thomas Greenwood, Globe Dye Works, president of the Philadelphia Chapter, introduced representatives from the College including: Richard S Cox, dean emeritus; Donald B Partridge, dean of students; "Bucky" Harris, new athletic director; and William Popp, president of the National Association.

Following the dinner, films of last year's Notre Dame-Oklahoma football game and outstanding professional games were shown to the group.

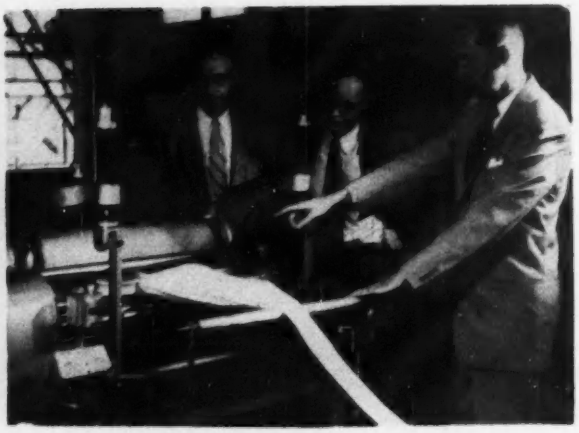
The next Meeting of the Club is tentatively scheduled for early January.



CIBA HEADQUARTERS IN NEW ENGLAND

Shown above is Ciba Company, Inc's modern New England sales and services headquarters at Rumford, R I. Just completed and occupied, it is described as the newest link in Ciba's program to consolidate, modernize, staff and equip all of its branch office facilities to meet customer needs with on-the-spot product and technical services.

Henry X deRedon, Ciba's New England manager, directs the field force and service staff of the division.



N C STATE TEXTILE SCHOOL RECEIVES GIFT

Looking over a new Tube-Tex Extractor Pad, which was given to the School of Textiles at North Carolina State College by the Tubular Textile Machinery Corporation, Woodside, N Y, are two officials of the college and a representative of the company. Left to right: Prof W E Shinn, head of the Knitting Department of the college's School of Textiles; Prof Kenneth S Campbell, professor of textile chemistry at the college; and Lee Rothenberg, Jr, Tubular Textile Machinery Corporation.

• GAF to Expand in Detergent Field

An expansion program in the liquid detergent field was announced last month by John Hilldring, president of General Aniline & Film Corporation.

Three major steps will initiate the expansion program. These will include construction of a new surfactants-manufacturing building on the Company's 55-acre property at Calvert City, Ky, scheduled for completion in July, 1956; installation of additional facilities at the Company's present plant in Linden, N J; and leasing of large storage-tank facilities in Los Angeles and Alameda, Calif.

The program, Mr Hilldring stated, will aid the Company's Antara Chemicals Division in maintaining its position as one of the country's major suppliers of detergents, especially the nonionic type.

The manufacturing operation at Calvert City will be adjacent to General Aniline's new acetylene products plant, which is now nearing completion and is expected to be in full operation after the first of the year. Contracts for the leasings of the Los Angeles and Alameda storage tanks have been completed and the facilities will be utilized immediately. Construction on the new surfactant facilities at Linden will get underway at once and work at Calvert City will start just after the first of the year. Linden currently is one of the largest manufacturers of detergents and other surfactants in the country.

Upon completion of the program, GAF will substantially increase its production of alkylphenols and Igepal- and Alipal-type surfactants. At the same time it will have improved facilities for handling drum and bulk shipments to customers across the country. The West Coast tank facilities will handle large volume surfactant movements in the area. Bulk shipments of nonionic surfactants to the West Coast are already being made from Linden via the American President Lines. The expansion is geared to meet projected requirements for the next several years, and the plans allow for further increased facilities as needed.

• New Colgate-Palmolive Grant to Rutgers

A $23,000 grant from the Colgate-Palmolive Company, Jersey City, N J, to support basic research in chemistry at Rutgers University during the next two years was recently announced.

A check for $11,500, representing the first-half installment of the grant, was presented to Rutgers president L W Jones by Thomas H Vaughn, Colgate-Palmolive vice president for research and development.

The State University's president pointed out that the new gift augments $12,000 which the firm presented to Rutgers in April, 1954 to establish the Colgate-Palmolive Research Fund in the School of Chemistry.

He said that the fund, which is unrestricted as to use, will finance three or more fellows working on a variety of research projects in chemistry. During the past year, the Colgate-Palmolive Fund supported studies of crystal structure, ion exchange and aromatic chemistry.

• Laucius to Address Quebec Section, CATCC

Joseph F Laucius, E I du Pont de Nemours & Co, Inc, will discuss "Structure and Application of Direct Dyestuffs" at the next regularly scheduled meeting of the Quebec Section, Canadian Association of Textile Colourists and Chemists, on Dec 10th at McGill University, Montreal.

At the October 15th meeting of the Section, Lindsay Chase, director of research and development, Dispersions Dept, Textile Colors Div, Interchemical Corp, spoke on "The Application of Pigments to Textile Fibers".

The most recent meeting, held Nov 19th at the St Hyacinthe Technical School, featured sessions on "Technical Control of Textile Processing", C F Fitton, Quality Control Group, presiding.

Future meetings for 1956 are scheduled as follows:

Jan. 21—"Consumer Standards of Acceptance", Jules Labarthe, Jr, Mellon Institute; Discussion Panels

Feb 18—"Dyeing of Wool and Nylon Blends", Hans Luttringhaus, Progressive Color and Chemical Co

Mar 17—"Cotton: The Mill and its Processes", Harold Fisher, Dominion Textile Co Ltd; Discussion Panels

Apr 20-21—20th Annual Meeting—"Research in the Textile Industry"

June 16—Annual Golf Tournament.

Technical meetings will be held in the Lecture Theatre, Physical Science Centre, McGill Univ. The Annual Meeting and Dinner will be held at the Sheraton-Mt Royal Hotel, Montreal.

• Celanese Chemical Division Opens New Storage Terminal

The Chemical Division of Celanese Corporation of America last month officially opened a new chemical storage terminal in Newark, N J, as the eastern distribution center for a broad list of liquid and dry chemicals produced by the company. One of the nation's largest facilities of its kind operated by an individual chemical company, the modern terminal reportedly has initial capacities of 4,000,000 gallons of liquid chemicals, 1,000,000 pounds of dry products and, in addition, a substantial drumming capacity.

R W KixMiller, vice president and general manager of the Chemical Division, said it will provide the company with an accelerated and highly efficient system for the distribution of chemicals in the rapidly expanding eastern market. Adequate storage capacity, improved pumping facilities and a remote electrical control system which is operable from several locations, he added, will bring about greater flexibility and maximum customer service.

Among the products which will be supplied from the terminal are intermediates, plasticizers and solvents.

Occupying more than 11 acres on both sides of Doremus Avenue north of Newark Bay, the terminal property is bounded on the east by the Passaic River and on the west by Plum Creek. The terminal is still in a construction phase and is expected to be completed early next year. Possibilities for expansion of present terminal capacity exist in acreage not yet utilized.

The Newark terminal when in full operation will be the nerve center for the entire national distribution system of Celanese's Chemical Division. It will control both the delivery and inventory programs of company terminals and warehouses now located at Carteret, N J; Chicago, Ill; Oakland, Calif; and Corpus Christi, Texas. The terminal will be linked to those points by teletype.

• Textile Program Attracts Half of LTI Student Body

Approximately 50 percent of the total enrollment of 831 students in the day program at Lowell Technological Institute registered this semester in the various textile curriculums — textile chemistry, textile manufacturing, textile sales and management, or textile engineering.

The Graduate School has 24 candidates for the master's degree, and the Evening Division enrollment, which fluctuated for many years at about 1500, this semester scored a new record with 2000 course registrants. The day program's 831 total includes 28 women students and 177 veterans of service with the U S armed forces.

Nicholas Drisch, who has charge of product development for Comptoir des Textiles Artificiels, Paris, France, and C H Fisher, chief of the Southern Utilization Research Branch, Agricultural Research Service, USDA, test a piece of cotton fabric for resistance to combustion. The fabric has been treated with the THPC-BAP process, a flame-resistance treatment developed at the SURB laboratory in New Orleans, La. Dr Drisch represents some 15 associated companies, and is on his tenth trip to the United States in a search for processes and products which can be profitably introduced into the European market. At the Southern Utilization Research Branch he was particularly interested in differential dyeing, and in new techniques for using the electron microscope with fibers.

GENERAL CALENDAR OF COMING EVENTS

AMERICAN SOCIETY FOR TESTING MATERIALS

Feb 27-March 2—Committee Week, Hotel Statler, Buffalo, N Y; Mar 13-16—Spring Meeting of Committee D-13 on Textiles, Warwick Hotel, New York, N Y; June 17-22—59th Annual Meeting and 12th Apparatus Exhibit, Chalfonte-Haddon Hall, Atlantic City, N J; Sept 16-22—2nd Pacific Area National Meeting and Apparatus Exhibit, Hotel Statler, Los Angeles, Calif; Oct 16-19—Fall Meeting of Committee D-13 on Textiles, Warwick Hotel, New York, N Y.

THE FIBER SOCIETY

Spring Meeting—May 2-3, The Clemson House, Clemson, S C; Fall Meeting—Sept 6-7, Warwick Hotel, New York, N Y.

MANUFACTURING CHEMISTS' ASSOCIATION, INC

5th Semiannual Meeting and Winter Conference—Nov 22, Statler Hotel, New York, N Y.

NATIONAL COTTON COUNCIL OF AMERICA

7th Annual Cotton Research Clinic—Feb 15-17, Pinehurst, N C.

PERKIN CENTENARY

May, 1956—London, England

PERKIN CENTENNIAL

September 10-15, Waldorf-Astoria Hotel, New York, N Y.

PHI PSI FRATERNITY

Annual Meeting—April 19-21, Alabama Polytechnic Institute, Auburn, Ala.

PLANT MAINTENANCE & ENGINEERING CONFERENCE

Jan 23-26—Convention Hall, Philadelphia, Pa.

THE QUARTERMASTER ASSOCIATION

Annual Convention—Oct 27-28, Conrad Hilton Hotel, Chicago, Ill.

QUEBEC SECTION, CANADIAN ASSOCIATION OF TEXTILE COLORISTS AND CHEMISTS

Dec 10, Jan 21, Feb 18, Mar 17 (McGill Univ, Montreal, Que); Apr 20-21 (Annual Meeting, Sheraton Mt Royal Hotel, Montreal); June 16 (Annual golf tournament).

SOUTHERN TEXTILE EXPOSITION

19th Exposition, Oct 1-5, 1956, Textile Hall, Greenville, S C.

TEXTILE RESEARCH INSTITUTE

1956 Annual Meeting—March 22-23, Hotel Commodore, New York, N Y.

TEXTILE TECHNICAL FEDERATION OF CANADA

5th Bi-annual Textile Seminar—June 5-7, Queen's Univ, Kingston, Ont.

TWENTIETH ANNUAL PROCESSING REVIEW NUMBER

THE Twentieth Annual Processing Review Number of the AMERICAN DYESTUFF REPORTER will appear on December 5th. Manufacturers of dyestuffs, textile chemicals, wet processing machinery, laboratory equipment, and incidentals for the wet processing plant have been invited to submit information concerning new products that have been placed on the market since November, 1954. Information will include the trade name of the product and a brief summary of its uses and properties.

NAMES IN THE NEWS

Brick

Molteni

Jacobs

The board of directors of Onyx Oil & Chemical Co, Jersey City, N J, recently announced the election of LEON P BRICK as executive vice president and acting president of the Company.

Mr Brick, who has been associated with Onyx for 28 years, was formerly with the Du Pont Company and the Clifton Yarn Mills. In his present position he has complete charge of sales from the firm's home office and six branch offices.

Also within the Onyx organization, HENRY A MOLTENI has been named plant manager in charge of all plant operations, and PAUL D JACOBS has been named group leader of the Textile Application Section of the Research and Development Laboratories.

Mr Molteni has been with Onyx since March, 1955 as assistant director of research in charge of product development and technical service. Prior to that time he was production manager in the fatty acid division of E F Drew & Co.

Mr Jacobs will be in charge of evaluation and mill adaptation of the textile chemical products synthesized by the Organic Research Group. Prior to joining Onyx in 1947, Mr Jacobs was with American Cyanamid Co at Stamford, Conn.

Hilton-Davis Chemical Co has announced the appointment of WILLIAM L SHARP as manager of sales of the textile division in the mid-Atlantic states, and that of GEORGE F MARTIN as assistant to NELSON S KNAGGS, vice president in charge of sales.

Mr Sharp will call on the trade in Pennsylvania, New York, New Jersey, and Delaware. His headquarters will be located in a warehouse soon to be completed in Secaucus, N J, where Hilton-Davis will stock its entire line. Before joining Hilton-Davis, Mr Sharp was associated with the Sherwin-William Co and Warwick Chemical Co.

Mr Martin, who joined Hilton-Davis in 1937, has been manager of sales to the printing ink industry for the Company's mid-west division since 1951. In his present position he will assist Mr Knaggs in directing sales to all industries served by Hilton-Davis.

W LAMAR POOLE is now representing Bryant Chemical Corp in North Carolina and Virginia. Mr Poole for the last five years has been with the Almardon Mills of Lonsdale, R I.

Sharp

Martin

Poole

HAROLD J ARNO, formerly of Onyx Oil & Chemical Co, has joined the staff of De Paul Chemical Co, Inc, Long Island City, N Y, as associate research director.

C W HILL, JR has joined American Alcolac Corporation as project engineer at the Baltimore plant. Mr Hill will be responsible for the design and construction of all equipment for new products. His previous connections include Mannington Mills and The Glidden Company.

CHARLES J PALMER has been named manager of Southern Dyestuff Corporation's educational and promotional activities for their new Denivat Everblue dye.

The Hart Products Corporation has announced the appointment of SIDNEY COHEN as director of the Research and Development Laboratory. Dr Cohen has been a member of the research staff since 1952, specializing in textile dyeing assistants and water-repellent treatments for textiles and leather.

ABRAHAM S ENDLER has joined the Corporation's research and development staff. He was with the National Bureau of Standards for several years and for the last ten years has been engaged in research on textile finishing materials as chief chemist for the De Paul Chemical Co, Inc. Mr Endler will concentrate on the development of resin finishes and stabilizing processes for textiles.

Cohen

Endler

Connell

GORDON AULT has been appointed assistant district manager of the San Francisco District of Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation.

Mr Ault has been a technical representative in the San Francisco and Los Angeles Districts since 1946.

JOSEPH E CONNELL and ROBERT J KINGSLEY have been named managers of new sales departments set up by the Pacific Division of the Nopco Chemical Co, with headquarters in Richmond, Calif.

Mr Connell, as sales manager of industrial chemicals, will be in charge of sales of Nopco chemicals for the textile, leather, paper and other industries, as well as the sales function for the Metasap Chemical Co, a subsidiary of Nopco. Associated with Nopco since 1935, he recently served as industrial sales representative for the Company in southern California.

Mr Kingsley will serve as sales manager of vitamin products.

Previously, one sales manager was responsible for all Nopco's sales. Under the new setup, each field will be handled independently.

THEODORE T HOWE has been named sales representative for Southern States Chemical Co for the Charlotte, N C, area. He will cover parts of North and South Carolina.

Mr Howe has had lengthy experience in dyeing and finishing with Riegel Textile Corp and Erwin Mills.

Thornton

Witwer

Schaafsma

Appointment of RAYMOND THORNTON as technical service manager has been announced by Arnold, Hoffman & Co, Inc. The company maintains technical service laboratories at Providence, Teterboro, N J, Charlotte and Atlanta. In his new post, Mr Thornton succeeds ARTHUR C MERRILL, JR, who has been assigned to special duties with the Commercial Division of Arnold, Hoffman.

Ahco's new technical service manager has had exceptionally broad experience in the dyeing and printing industry with the Calico Printers' Association, the former I G Farbenindustrie, and Imperial Chemical Industries. Recently, as head of ICI's Textile Printing Service Laboratory, he has travelled widely throughout the world-wide textile trade while maintaining active direction of investigations which bear his name in published works and patent literature.

DANIEL B WITWER has been appointed manager of the Acetylene Chemicals Department of Antara Chemicals, a sales division of General Aniline & Film Corporation.

The newly formed department, which is located at Antara's New York office at 435 Hudson Street, will handle the sales of the products manufactured at the Company's new $6,000,000 plant at Calvert City, Ky, which is scheduled for full scale production in early 1956.

Mr Witwer joined General Aniline's Commercial Development Department in 1949 and since that time has been engaged in the market development of the new line of products from the Company's broad acetylene derivatives program.

WILLIAM MICHAELIS has joined the research staff of Mona Industries, Inc, Paterson, N J, where he will be concerned chiefly with surface-active agents. Among Mr Michaelis' previous associations are Onyx Oil & Chemical Co, Standard Chlorine Chemical Co, and Koppers Co, White Tar Division.

The promotion of BERNARD R SCHAAFSMA to the post of assistant director of research has been announced by the Colgate-Palmolive Co.

Dr Schaafsma will supervise the research activities of the Synthetic Detergents Division, Soaps Division, Mechanical Engineering and Pilot Plants.

He has been with the Colgate-Palmolive Company since 1946, most recently as head of the Physical Chemistry Division.

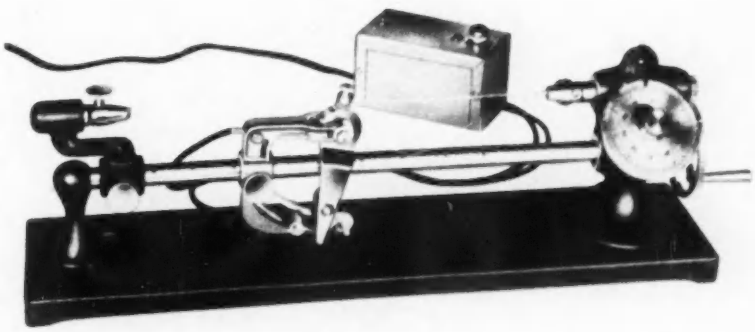
• NEW PRODUCTS AND DEVELOPMENTS •

• Improved Pilling and Wear Tests

Fabric Development Tests, PO Box 45, Brooklyn 32, N Y, has announced that numerous advances in the Appearance-Retention Test have been incorporated in the new ASTM method D-1375-55T for testing the "Pilling Propensity of Textile Fabrics."

A 5-minute test using new, durable wear-pill abradants is said to give better definition of lower levels of pilling with clear finished woven fabrics, particularly difficult-to-test gabardines. A special 5T Wear Disc and modified sample holder reportedly give improved results with knitted and soft woven fabrics. With spun-knit goods, an 8-second test measures how readily pills will form, while a one-minute test shows how much pilling may be expected with continued, more severe wear. The same 8-second test is used to measure the nap cohesion of fulled or napped fabrics.

It is stated that more uniform, faster surface wear and abrasion tests on knitted and woven fabrics are run with a 7K Wear Disc. Rubber and plastic films and coatings are tested with a 3K Wear Disc. The new abradants were developed to give greater durability and uniformity and reduce replacement coats, it is reported.



Standard Scott Model T-1 Twist Counter equipped with pendulum attachment for determining the twist of single yarn.

• Singles Yarn Attachment for Standard Scott Twist Counter

Scott Testers, Inc, 63 Blackstone St, Providence, R. I., has introduced a pendulum attachment that may be applied directly to any Standard Scott Twist Counter to give the added facility for analyzing singles twist. The method of operation is conventional. A yarn is inserted into a clamp attached to a pendulum. The swing of the pendulum is limited by adjustable stops, and a tension is applied to the yarn before the other end is secured in the head of the twist counter. This tension reportedly decays as the twist is removed, so that when all the twist has been removed the pendulum is vertical and tension is entirely absent.

When the twist is put in, in the reverse direction from the original, the tension of the pendulum is re-established and a light attached to the upper stop indicates when an equivalent tension has been re-applied. This light is mounted in a small box, which also contains a transformer for reducing 110 V lighting circuit to the 6 volts used to operate the light.

• Mercadium Reds

Recent publicity about selenium shortages has provided a setting for the announcement of a new chemical pigment discovery by the Pigment Color Division of Imperial Paper and Color Corp, Glens Falls, N Y. With basic patents pending, Imperial is launching its Mercadium reds to industry at large. This offering provides a range of readily available, brilliant and durable reds.

Mercadium reds, a trade name intended to indicate a combination of the sulfides of cadmium and mercury, are said to be somewhat more economical than the cadmium sulfo-selenide reds they will replace. They reportedly offer equal performance along with improved brilliancy and cleanliness of hue, are insoluble in the processing media of industry, heat resistant at elevated temperatures, and extremely fast to alkali and the deteriorating effects of exposure to sunlight and the elements.

Imperial is now producing a light and a dark Mercadium red, and is planning intermediate and maroon shades to a total of six in all.

• Dytol J-68; 95% Lauryl Alcohol

Two new lauryl alcohols, designated Dytol J-68 and 95% Lauryl Alcohol, have been added to the line of Dytol higher fatty alcohols, according to a recent announcement by Rohm & Haas Co, Philadelphia 5, Pa.

Containing approximately 80% of C_{12} alcohol, Dytol J-68 is available in drum and tankcar quantities. According to the company, it should prove particularly interesting in applications where the yield of C_{12} derivatives is important. Dytol J-68 contains 8 to 10% more C_{12} alcohol than Dytol A-24, and is available at the same 40c per pound tankcar price. 95% Lauryl Alcohol may be obtained in developmental quantities only, at a standard developmental price of $2.00 per pound.

As antifoaming and emulsifying agents, these new Dytol alcohols are said to be of interest in a variety of fields. For textile and surface-active agent applications, they serve as finishing and softening agents or as emulsifiers and detergents.

Literature on the Dytol fatty alcohols, including the new Dytol J-68 and 95% Lauryl Alcohol, is available from Rohm & Haas on request.

• Taylor Permafused* Thermometer Pigment

A recurring problem with thermometers —that of the pigment in etched graduations and markings chipping, loosening or dissolving—is reported to have been overcome with the introduction, by Taylor Instrument Companies, Rochester, N Y, of a new Permafused pigment used in etch stem, mercury-filled, laboratory-type thermometers.

The special pigment, a deep reddish brown, reportedly fuses directly into the glass of the thermometer and becomes part of the glass itself. It is therefore claimed to be as impervious as glass to any solution in which it may be used, ie, boiling organic solvents and all acids except those which will attack glass.

The new pigment is said to provide lasting legibility and longer life to the instrument and to eliminate possibility of contamination of solutions by dissolved pigments.

* Trade Mark

• Aerosolized Water Repellent

Water-Skipper*, a new water repellent packaged in aerosol form, has been introduced by Textile Adjuncts Corp, 876 Pacific St, Brooklyn 38, N Y. Formulated to contain high-melt silicones and waxes, and a new special-processed tung oil derivative, Water-Skipper is said to render porous materials water repellent and nonporous materials water proof.

* Trade Mark

Designed for use in special treatment of natural or synthetic cloth materials, protective clothing, shoes, canvas, felt, paper, or wood, Water-Skipper is claimed to have application properties which offer a handy way to treat workmen's clothing, industrial equipment, electric wiring, and ignition systems exposed to rain, water, or general outdoor exposure.

It is said to be easy and economical to apply, and the manufacturer states that it can reduce maintenance costs by reducing rust and electrical shorts caused by moisture.

Water-Skipper is packaged in regular 12-oz aerosol cans, disposable 2-lb commercial bombs, and upon request, 5-lb disposable commercial spray cylinders.

• New Substantive Softeners

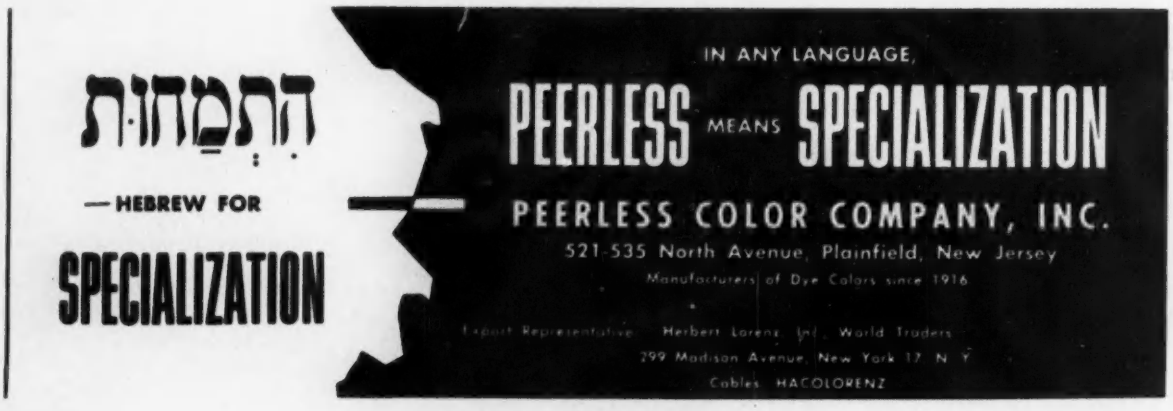
Wica Chemicals, Inc, Charlotte, N C, has introduced a series of new substantive synthetic softeners, covering a full range of ionic activity.

It is claimed that these materials do not discolor or affect dyed shades appreciably. It is further claimed that they have a minimum effect on light fastness, and are "extremely" resistant to high temperatures.

Wica Softener T-535 is recommended by the Company for use in resin baths, and is said to be highly compatible with the ordinary finishing materials encountered. It is described as 50% active and cationic. Bath stability is said to be excellent over a wide pH range.

Wica Softener A, a 50%-active anionic finishing agent, is recommended by the Company for resins baths where metallic salts are employed as catalysts. It reportedly offers excellent penetration for high twist yarns and tightly constructed fabrics.

Wica Softener N is a 50% active neutral softener.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— HEBREW FOR
SPECIALIZATION
IN ANY LANGUAGE,
PEERLESS MEANS SPECIALIZATION
PEERLESS COLOR COMPANY, INC.
521-535 North Avenue, Plainfield, New Jersey
Manufacturers of Dye Colors since 1916
Export Representative: Herbert Lorenz, Int'l. World Traders
299 Madison Avenue, New York 17, N. Y.
Cables: HACOLORENZ

calco

Dyelines

AMERICAN Cyanamid COMPANY DYESTUFF DEPARTMENT BOUND BROOK, NEW JERSEY

NEW YORK • CHICAGO • BOSTON • PHILADELPHIA • CHARLOTTE • PROVIDENCE • ATLANTA • LOS ANGELES • PORTLAND, OREGON

For Bright, Fast Red-Violet...

Calcofast Wool Violet 6R

When wool, silk, nylon, Acrilan or Vicara dyeing requirements call for bright violet shades with excellent fastness properties, Calcofast Wool Violet 6R gives highly desirable results. It is a metallized dyestuff, considered by many dyers to be a very necessary shading color for reddening shades and for controlling shade changes in artificial light.

Excellent leveling properties at a low pH on wool permit dyeds of Calcofast Wool Violet 6R to be made in a high temperature dye bath without serious danger of unevenness.

For complete information, samples, call your Cyanamid representative.

Intensified Whites, Pastels Is Growing Demand

Fluorescent color reactions in whites and pastels which give maximum brightness in coincidence with sun or Color-Matching White 37, a most effective brightener for cottons, viscose rayons and other cellulosic fabrics. It is simple to use in dyeing and padding operations. This tactile brightener has excellent water solubility, is insensitive to pH. It can be applied either from neutral, alkaline or acid baths up to 1.65 pH; or be dyed in package machines or other normal mill applications. Full technical data on request.

"C'mon down, Mac . . . we have whiter whites down here!"

CALCOCHROME YELLOW FC

Versatile Wool Dye Yields Easily Controlled Reddish Yellow Shades

Calcochrome Yellow FC is one of the most useful chrome yellow dyes on the market. Its reddish yellow shade has excellent fastness to light, washing, crocking, sea water, alkalies, and carbonizing when applied to wool by any of the three regular chrome dyeing methods. It gives excellent results in all stages of manufacture of wool — top, stock, skeining, yarn and fabrics. Carbonizing does not affect the shade of Calcochrome Yellow FC either making it much easier for the dyer to control his reddish shades. A pH of 4 the shade remains the same as at a pH of 2.

This product is also widely used, alone and in combinations, as a regular acid dye whenever a fast-to-light red shade of yellow is required. Because it is completely insensitive to acids, Calcochrome Yellow FC can be successfully applied to piece goods even from a sulphuric acid bath.

No wool dyer's range should be without this excellent yellow.

Your Cyanamid representative will give you a sample on request.

Continuous Application of Sulphur Blacks on Cotton Piece Goods by Pad-Steam Methods

This method of application has been quite popular since pad-steam ranges came into use for dyeing vat colors. Both powder and liquid types of sulphur blacks give good results but leveling concentrates of the liquid types has increased demand for them. They give equally good money value as compared to the powders, and in some cases the dyeings are cleaner and faster. Naturally, the use of a range is practical only when the long are of 10,000 yards or more, as cleaning is a time-consuming operation.

Less equipment is required than in vat dyeing, as a pigment padder and flue dryer are not necessary. A fairly heavy 3-bowl padder capable of 5 tons or more pressure is used for applying the dissolved dyestuff. To give two dips and two nips, a box holding about 60 gallons is used. A steamer follows the padder and it should be large enough to give 30-60 seconds' running at 30 yards per minute. The temperature in the steamer should be held between 220° F. and 225° F.

Following the steamer is an 8 to 10 box open width washing range with squeeze rollers after each box. Plain cotton squeeze rollers are adequate at this point. Water equal to 4 times the weight of cloth per hour is used in each box. Temperature of each box increases the efficiency of each wash. Finally, a set of drying cans should be installed at the end of the range. See recipe to complete the operation.

A typical procedure for continuous dyeing cotton fabrics with the following:

Pad at 180°-200° F. with an aqueous solution containing

4 oz. per gal. of sodium sulfide

Steam 30 seconds at 220° F.

Two boxes running cold water.

One box running hot water.

One box sodium bichromate and acetic acid at 180° F.

Two boxes running hot water.

One box hot synthetic detergent.

One box hot running water.

One box warm water with soda ash or sodium acetate.

Squeeze and run dry.

When quality counts . . .

it pays to go to a specialist

WHEN QUALITY DYE PERFORMANCE COUNTS, IT PAYS TO GO TO

ALTHOUSE

Leading Specialists in Dyes for Cotton — Rayon — Nylon and Other Synthetics and **blends**

For 40 years Althouse research has pioneered in raising textile industry standards of

COLORFASTNESS

This record of leadership assures highest quality performance when you specify these famous, exclusive Althouse dye specialties:

Superlitefasts	Nylanthrenes
Azoanthrenes	Nydyes
Supernylites	Sol-Aqua-Fast

ALTHOUSE

worried about
WETTING AGENTS
in goods to be treated with
Water Repellents?

Forget your fears!
Use **ATOLENE NR**, the wetting agent and dye leveller **without re-wetting properties**. Even small amounts carried over from dye bath will not affect spray ratings of goods treated with water repellents. Write for information.

TEXTILE CHEMICAL DIVISION OF
dexter CHEMICAL CORP.
New York 59, New York
Boston—Charlotte—Atlanta—Greensboro—Buenos Aires

CLASSIFIED ADVERTISEMENTS

Advertisements in this section are restricted to HELP WANTED—POSITIONS WANTED—EQUIPMENT wanted or for sale. Rates, effective February 1, 1951: One-time, $10.00 per column inch; 3 consecutive times (same copy), $9.00 per column inch; 13 or more times, $8.00 per column inch; Position Wanted, $2.00 per column inch. Figure 38 average words per column inch. Publisher reserves the right to reject or discontinue any classified advertisement. Replies should be addressed: Box Number . . . c/o American Dyestuff Reporter, 44 East 23rd Street, New York 10, N. Y.

ABSTRACTING SERVICE—Abstracting and digesting of foreign patents and periodicals. Literature review and special reports in dyestuff and cellulose chemistry. PAUL WENGRAF, 88-36 ELMHURST AVENUE, ELMHURST 73, NEW YORK.

WANTED: HEAD CHEMIST—for large box dyer. Also 10 Jiggs. Good salary. Must know new fibres, colors, finish trouble shooting. Write Box No. 112.

POSITION WANTED: Textile Chemist, 10 years' diversified experience with leading dyestuff companies. College graduate. Interested in responsible position in laboratory, plant or in technical sales. Write Box No. 108.

SALES MANAGER REQUIRED for New York office of New England dyeing and finishing plant. Must be well acquainted with cottons, rayons and newer synthetic piece goods. Write stating age, experience and salary required. Write Box No. 114.

POSITION WANTED: Degree in Textile Chemistry. Diversified experience includes research and development, sales and service, machine printing and finishing, heavy experience in the formulation of emulsion printing colors. Desires responsible position printing or finishing; technical sales. Will relocate. Write Box No. 111.

AVAILABLE: Young man with 10 years' combined laboratory and mill experience, technical background. Interested in a responsible position which will enable fuller use of capabilities. Married, veteran, responsible. New York-New Jersey area preferred. Write Box No. 119.

DYER-CHEMIST WANTED: By leading mill specializing in fine woolens and cashmeres. Yarn and stock dyeing. Must be aggressive and thorough. Age 30-45. Top salary and secure future for a well-qualified man. State education and experience fully in your first letter. All replies held confidential. Write Box No. 122.

POSITION WANTED: B.Ch.E., 1949, age 32. Acquainted all phases of O/W textile printing paste formulation, including pigment dispersion, latex and resin compounding. Broad surface coatings background. Seeks position New York-New Jersey area. Available immediately. Write Box No. 123.

A New England company engaged in the manufacture of dyestuffs and auxiliary products, has a vacancy in its Technical Service Department for a Senior Technical Officer, and applications are invited. The applicant should hold an honors degree in Chemistry or Physical Chemistry and post-graduate experience. Details of industrial experience should be stated, and preference will be given to applicants with experience with vat dyes. A successful applicant must be able to direct junior staff in investigational projects. All members of our Technical staff have been informed of the insertion of this advertisement. Write Box No. 124.

Standardgrams

Keep Standards High With Standard Finishes

by JOHN J. BLOETJES

Metropolitan N. Y. Sales Representative

The problem of whites on acetate, nylon, Dacron, Orlon, and all synthetic fibers are solved with the use of Standafin 77, a fully polymerized resin in emulsion form that requires no curing or after-treatment, no washing, and is readily applied by ordinary finishing procedures on conventional equipment. The problems of yellowing of whites and light shades are eliminated; the worry of odor is gone.

Standafin 77 imparts a soft, silky hand, is an exceptionally good non-slip and is compatible with starches, weighters and dullers. The cost of finishing with Standafin 77 is low, as you use small percentages of this resin. In most formulas, 2 to 5% of Standafin 77 has been found tb do an exceptional job.

In finishing of Nylon and Dacron for men's shirtings Standafin 77 imparts a full soft hand that gives wonderful quality to these fabrics. This product also has very good anti-static properties. Finishers of Acetate satins that require a high lustre and good non-slip qualities for use in underwear, etc. find that Standafin 77 gives these qualities, as well as the assurance that the product does not irritate the skin or cause dermatitis.

Standafin 77 is easy to use as it goes into solution very readily and does not foam. It is dissolved in approximately an equal amount of water at 120° – 140°F. and the solution added to the bulk of the finishing liquor. The goods are padded on a thoroughly cleaned quetsch at 120°F. Curing is unnecessary but drying must be complete with no tackiness resulting from insufficient drying. If padding and drying in two separate operations is necessary, it is well to batch up loosely or run into a box and avoid partial or uneven drying.

Calendering, decatizing, etc. now follow as desired. It has been found that a light calendering, with just the weight of the warm roll as set, tends to fluff up spun rayons by breaking down any surface film, although this may be found unnecessary.

Let STANDARD help you standardize your finishing standards.

Pyrotex 121, an Economical Wet Processing Agent for All Fabrics

While there are hundreds of detergents on the market today, Pyrotex 121 has been found to answer the dyers' need for a product that is easy to handle, easy to dissolve, and one that can be used on all fabrics.

Having a pH of 7, Pyrotex 121 can be used on acetate, rayon, nylon, Orlon, Dacron and all synthetic fibers. It dissolves easily in water, to form a neutral solution having good stability in hard water.

Low cost operation results from small amounts of Pyrotex 121 needed for boil-off, scouring, penetration, dyeing, print washing, after soaping and naphthol dyeing. Best results are obtained when used with TSPP, tripolyphosphate, etc. Use of Pyrotex 121 reduces the number of rinses because of its easy rinsability.

Pyrotex 121 has exceptional sudsing qualities which are very necessary, particularly in jig dyeing. This promotes a clean bath. In jig scouring and dyeing, one to two pounds of Pyrotex 121 per jig is usually sufficient. In regular stick boil-off or continuous boil-off machines, such as Hermas, Henniken Boil-Off Machines, Morrison or Van Vlaanderen, ⅛ to ¼ % on the weight of the liquor is usually sufficient.

In dyeing, Pyrotex 121 promotes levelness, penetration and clear shades; chafing and rub marks are prevented and the goods are left with a soft, pleasing hand.

We recommend you try Pyrotex 121 – it's truly the "Aristocrat of Detergents."

Standafin T. Conc. Gives Swish to Taffeta

When a taffeta finish requiring swish, non-slip and extraordinary character is needed, send for STANDAFIN T CONC. It imparts a rustling sound, firm hand and fullness that is so desirable in this type of cloth.

STANDAFIN T CONC. is a non-curing resin that requires no after-treatment or washing. It can be used with weighters and water repellent compounds.

STANDAFIN T CONC. is easy to use on pad, quetsch, or Palmer tenter unit. It will not mark off and is not affected by atmospheric conditions.

Phone us and switch to STANDAFIN T CONC.

Standafin 92 Uses

For a blanket binding finish that imparts a smooth round hand as well as a good luster, use STANDAFIN 92. This product has uses in the children's and ladies' blouse field as well.

Phone or write us for samples and information on this product.

STANDARD CHEMICAL PRODUCTS, Inc.

HOBOKEN, NEW JERSEY · CHARLOTTE, NORTH CAROLINA

CHATTANOOGA, TENN. · PATERSON, N. J. · SWANSEA, MASS. · SALISBURY, N. C.

SUNBURY, PA. · SACRAMENTO, CALIF. · GREENSBORO, N. C. · GREENVILLE, S. C.

DOW CORNING SILICONE DEFOAMERS

have proved their efficiency and versatility in countless applications. For example:

1 OUNCE KILLS FOAM IN . . .

- **250,000 lb** vat dye solution
- **125,000 lb** 6% starch sizing solution
- **20,830 lb** textile dye/penetrant
- **15,625 lb** zein containing rayon sizing

And remember—both Dow Corning Antifoam* AF Emulsion and Antifoam A are physiologically harmless. Both increase production, reduce processing time, eliminate the waste and fire hazard of boil-overs.

NOW AVAILABLE

New booklet gives complete information on Dow Corning Antifoam agents, the most efficient and versatile defoamers ever developed.

*TM DOW CORNING CORP.

Mail coupon today for FREE SAMPLE

DOW CORNING SILICONES

Dow Corning Corporation
Midland, Mich., Dept. 0211

Please send me:

☐ Booklet on Dow Corning Silicone Defoamers. FREE sample of ☐ Antifoam A Compound or ☐ Antifoam AF Emulsion.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE____STATE_____

● Classified Advertisements ●

A New England company engaged in the manufacture of dyestuffs and auxiliary products, has vacancies in its Technical Service Department for Junior Technical Officers. Applicants should hold a degree in Chemistry, Applied Chemistry, or Physical Chemistry, and postgraduate experience is desirable. Some knowledge of dyeing, printing and finishing of textiles is desirable but not essential. All members of our Technical staff have been informed of the insertion of this advertisement. Write Box No. 125.

CHEMIST AND COLORIST for Philadelphia branch laboratory of prominent dyestuff manufacturer. Must have good background of education and experience. Good opportunity. Please give full particulars including salary expected and telephone number. Write Box No. 126.

DEMONSTRATOR, experienced in the application of detergents and other textile chemicals for the Philadelphia district of a prominent manufacturer of dyestuffs and textile chemicals. Should have good background in chemistry. Good opportunity. Please give full particulars including salary expected and telephone number. Write Box No. 127.

WANTED

RESEARCH ASSOCIATE

for investigations in the

AATCC LABORATORIES

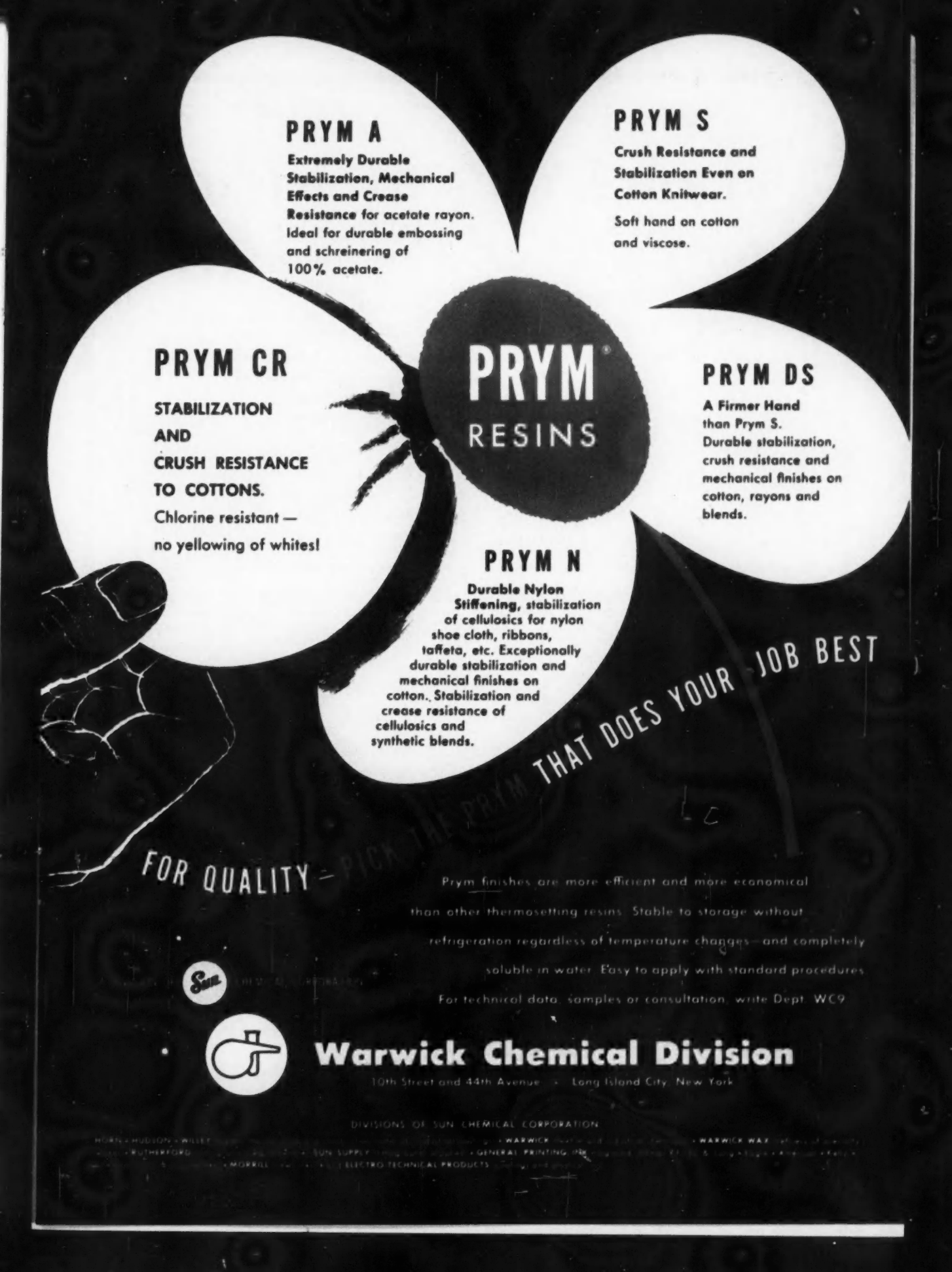
Bachelors Degree Prerequisite

Please reply, with brief resume of training and experience, to the

DIRECTOR OF RESEARCH

American Association of Textile Chemists and Colorists

National Headquarters
Lowell, Massachusetts


PRYM A
Extremely Durable Stabilization, Mechanical Effects and Crease Resistance for acetate rayon. Ideal for durable embossing and schreinering of 100% acetate.
PRYM S
Crush Resistance and Stabilization Even on Cotton Knitwear.
Soft hand on cotton and viscose.
PRYM®
RESINS
PRYM CR
STABILIZATION AND CRUSH RESISTANCE TO COTTONS.
Chlorine resistant — no yellowing of whites!
PRYM DS
A Firmer Hand than Prym S. Durable stabilization, crush resistance and mechanical finishes on cotton, rayons and blends.
PRYM N
Durable Nylon Stiffening, stabilization of cellulosics for nylon shoe cloth, ribbons, taffeta, etc. Exceptionally durable stabilization and mechanical finishes on cotton. Stabilization and crease resistance of cellulosics and synthetic blends.
THAT DOES YOUR JOB BEST
FOR QUALITY —
Prym finishes are more efficient and more economical than other thermosetting resins. Stable to storage without refrigeration regardless of temperature changes — and completely soluble in water. Easy to apply with standard procedures. For technical data, samples or consultation, write Dept. WC9
Sun
Warwick Chemical Division
10th Street and 44th Avenue • Long Island City, New York
DIVISIONS OF SUN CHEMICAL CORPORATION
• WARWICK
• WARWICK WAX
• GENERAL PRINTING INK
• ELECTRO TECHNICAL PRODUCTS

*A **cure**, not a treatment, for Pollution Problems...*

This is the first in a series of advertisements based on a technical paper by B. W. Dickerson, Sanitary Engineer, Hercules Powder Company. A complete copy of the report or additional technical data on CMC Warp Size can be obtained by writing directly to Hercules.

If finishing mill wastes cannot be dumped into nearby waters in their present form and the cost of treatment is prohibitive, what is the answer? Many waste engineers have found that going to the source of the trouble can correct the situation and eliminate the need for a large capital expenditure for sewage plant facilities.

In a typical finishing plant, a percentage breakdown of the BOD (Biochemical Oxygen Demand) shows that the desizing operation is the obvious "villain". Up to 60 per cent of BOD pollution is a result of desizing, with dyeing and finishing contributing 30 to 40 per cent and bleaching about 10 per cent.

Years of preliminary study, followed by actual use on a production scale, have demonstrated that the introduction of proper amounts of CMC Warp Size in the sizing formulation can cut desizing pollution by as much as 75 to 85 per cent. Such a reduction of pollution would permit many mills to conform to abatement regulations without the need for construction and operation of a waste treatment plant. For mills with more severe pollution problems, the use of CMC Warp Size can reduce the cost and operating expense of treatment units as much as 50 per cent.

Formulations composed of two parts starch and one part CMC Warp Size provide adequate sizing at 6 to 8 per cent add-ons. In many instances, this much lower add-on will reduce the amount of water required in desizing by as much as 50 per cent. The presence of water soluble CMC Warp Size in the formulation can eliminate the need for the use of enzymes, greatly speeding and simplifying the desizing process.

Virginia Cellulose Department

HERCULES POWDER COMPANY

993 Market St., Wilmington 99, Delaware

VC55-5

HASTINGS LIGHT FAST VIOLET IRS—(C. I. 1073)

and

HASTINGS LIGHT FAST VIOLET 3RL

Excellent Level Dyeing Properties
Very Good Fastness to Light

Recommended for producing fast shades on Ladies' Dress Goods, Carpet Yarn and Upholstery Materials.

ZINSSER & COMPANY, Inc.

Subsidiary of The Harshaw Chemical Company

ESTABLISHED 1897

Manufacturing Chemists

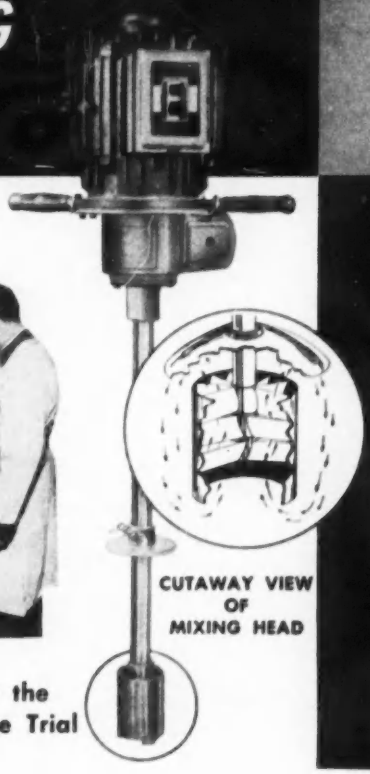
HASTINGS-ON-HUDSON NEW YORK

SHEAR-FLOW

GABB SPECIAL PRODUCTS

INDUSTRIAL MIXER

MIXES ANYTHING THAT FLOWS!



THE MODERN MIXER FOR MODERN FINISHES

- ★ CUTS MIXING TIME TO 1/5th
- ★ DOUBLE SHEARING ACTION
- ★ LOW MAINTENANCE COST
- ★ UNIFORMITY OF MIXTURE
- ★ NO OPERATING TORQUE
- ★ QUICK CLEANING

CUTAWAY VIEW OF MIXING HEAD

GABB SPECIAL PRODUCTS

Division of E. Horton & Son Co. WINDSOR LOCKS, CONN.

Ask about the 15-day Free Trial

E. J. FEELEY CO.

DYESTUFFS
MANUFACTURER OF
TEXTILE CHEMICALS

263 SUMMER ST. BOSTON, MASS.
1700 WALNUT ST. PHILADELPHIA, PA.
650 STATE ST. CHARLOTTE, N. C.

AND

DISTRIBUTORS IN THE SOUTH

OF

BASES
STABLE SALTS

PYRAZOLINES (FAST DIRECT DYES)
DIPYRAZOS (DEVELOPED DYES)

COLORS FOR WOOL

MANUFACTURED
BY

PHARMA CHEMICAL CORPORATION

"UNIONOL"

For Uniform Application of Dyes to 15 Denier Hosiery

Use this improved dyeing oil to assure level dyeing—good unions—and to guard against costly rejects and redyeing.

LEATEX *"Always Reliable"*

LEATEX CHEMICAL COMPANY
2722 N. HANCOCK ST. PHILADELPHIA 33, PA.

PQ SODIUM SILICATES

...FOR TEXTILE WET PROCESSING

Come to PQ for all your silicate needs—

Star **Starso** **Sodium Silicates**	**BLEACHING** Kier J-Box Systems
Metso Granular Sodium Metasilicate	**SCOURING** Rayon Acetate Nylon Kier Boiling Other Detergent Operations
N Sodium Silicate	Raw and Waste Water Treatment Corrosion Control in Kiers and Water Systems
Seal Sodium Silicate	Sealing Shipping Containers

Trademarks Reg. U. S. Pat. Off.

Call your PQ distributor or write us for information, samples and prices.

PHILADELPHIA QUARTZ CO.

PQ Soluble Silicates
METSO DETERGENTS

1170 Public Ledger Bldg., Phila. 6, Pa.

Durably Built for Heavy Service!

"Metalsmiths" Stainless Steel and Monel Utensils

Prompt shipment —anywhere

"Metalsmiths" corrosion-resistant utensils are sturdy, well-designed, long-wearing. Standard in textile trade for over 30 years. All items shown, plus beakers, stock pots, batch cans and shovels in stock for prompt shipment.

WRITE FOR LATEST CATALOG — PRICE LIST

METALSMITHS

Division of Orange Roller Bearing Co., Inc.

562 White Street Orange, N. J.

PERMANENT AGELESS DURABLE

"Duro-Tex" Stainless Batch Cans

SEAMLESS WELDED — POLISHED

Cap. Gal.	Dia. In.	Height In.	Each
10	13¼	18	$36.30
15	15⅝	18	46.20
20	16	24	52.80
25	18	24	62.70
30	20	24	69.30
40	22⅜	24	79.20
50	22⅜	30	90.75
75	28	30	105.60

SPECIFICATIONS: Type 304 Stainless Steel, heavy gauge and polished, all-welded and blended on the inside, with inside bottom corner rounded. Aluminized handles and steel rings around top edge and bottom edge. Top edge curled and wired. Bottom ring tackwelded to can.

Seamless Stainless Steel Dyehouse Ware. Ask for Price List.

READING SCIENTIFIC COMPANY

13th & Pike Streets Reading, Penna.

NO PREMIUM PRICE for the purest EDTA

Glyco's ethylenediamine tetraacetic acid (EDTA) gives you more for your money. This versatile sequestering agent contains 99+% active ingredient, and is the purest form available commercially. No inert salts are present. The highest possible concentration of material goes to work in your operation, with no additional cost for purity.

The textile industry uses the TETRINE®S in processing cotton, rayon, wool and the synthetics for:

kier boiling	**continuous boil-off**
scouring	**bleaching**
dyeing	**stripping**
re-dyeing	**finishing**

Glyco's EDTA and its salts – the TETRINE®S – are supplied from a new plant specially designed to make these products. Plant – products – personnel – all are geared to eliminating your trace metal contaminant troubles. Send for samples, purity specifications, and our catalog *THE TETRINE®S*.

the **TETRINE®S**

Glyco's EDTA

GLYCO Products Co., Inc.

Empire State Building, New York 1, N. Y.

NONIONIC SURFACTANTS • SYNTHETIC WAXES • EMULSIFYING AGENTS

How to reduce your percentage of re-runs

TEXTILE PROCESSORS REPORT THAT PROCTOR CHEMICALS HELP MAINTAIN CONSISTENT PRODUCTION QUALITY

Proctor Chemical Co. provides its customers with quality controlled products in which uniformity is constant. This feature of uniformity makes for even performance and results in more efficient production.

In the modern plant laboratory chemists control each product during manufacture and test it prior to release—assuring customers of product performance as specified.

Here is one of Proctor Chemical Company's products for better processing results . . .

PROTAMINE M

A cationic substantive softener particularly applicable to crease-resistant and wash-and-wear finishing.

- Yields a desirable hand.
- Lubricates fibers to improve tear strength.
- Maintains whiter whites during processing and storing.
- Is compatible with resins.
- Is stable in alkaline or acid solutions.
- Does not build up excessive foam in processing.

Write for FREE samples and Technical Service Bulletins

PROCTOR CHEMICAL CO. INCORPORATED

SALISBURY, NORTH CAROLINA

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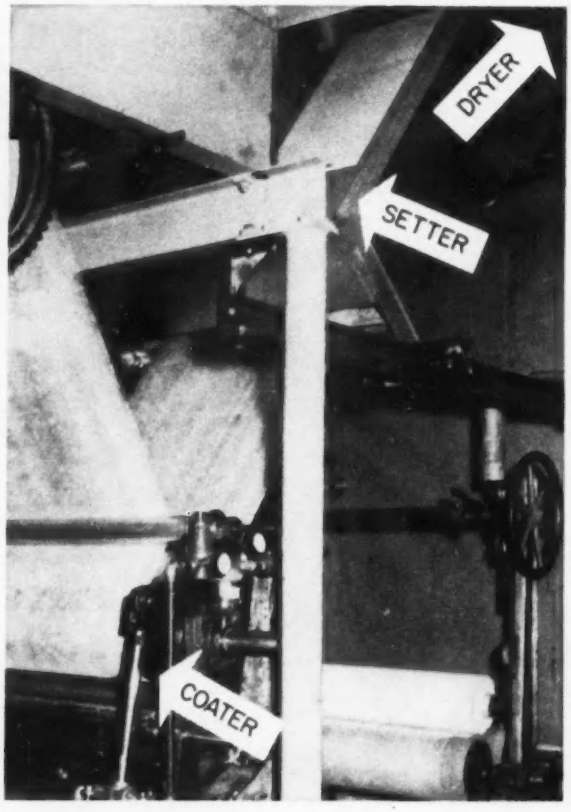

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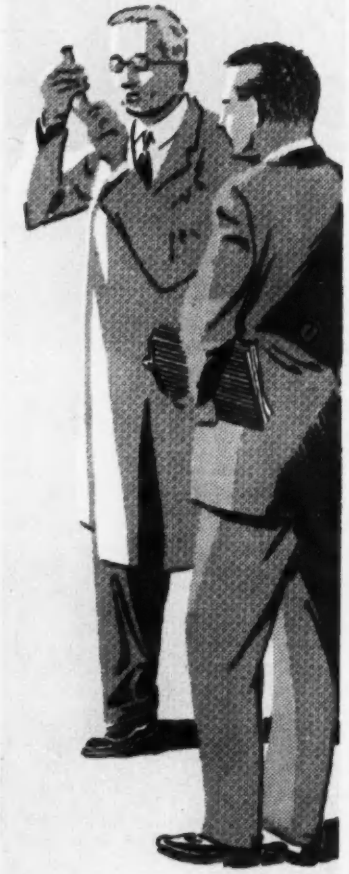

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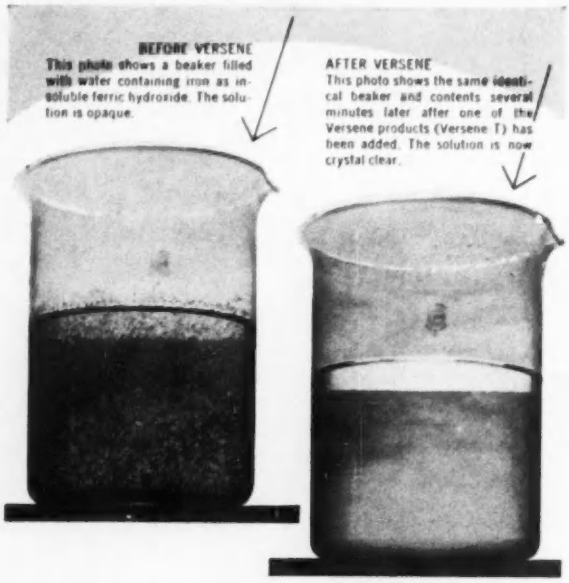
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